DOCUMENT RESUME

ED 202 646 RC 012 733

TITLE	National Migrant Education Program: Math Skills.
SPONS AGENCY	Office of Education (DHEW), Washington, D.C.
PUB DATE	Aug 79
CONTRACT	300-76-0090
NOTE	160p.; For related documents, see RC 012 730-732 and RC 012 734-736.
EDRS PRICE	MF01/PC07 Plus Postage.
DESCRIPTORS	Decimal Fractions; Developmental Tasks; Elementary Secondary Education; Fractions; Learning Readiness; *Mathematics Education; *Measures (Individuals); *Migrant Children; *Migrant Education; Number Concepts; Percentage; Set Theory; *Skill Analysis; *Student Records; Transfer Students; Whole Numbers
IDENTIFIERS	*Migrant Student Record Transfer System

ABSTRACT

Used as an integral part of the migrant student skills system operated by the Migrant Student Record Transfer System (MSRTS), the math skills list contains a catalog of math skills typical of the K-9 grade range. This catalog includes a sample of the MSRTS transmittal record, a reporting form which permits teachers to report the math skills mastered and under study by migrant students. The document presents an explanation of terminology used for MSRTS math skills: areas, topics, subtopics, and skills. It includes directions for recording math skills development in the following areas: (1) readiness, (2) number meaning, (3) whole numbers, (4) fractions, (5) decimals, (6) percent, (7) measurement, (8) geometry, (9) probability and statistics, and (10) sets. Specific topics, subtopics and skills are outlined for each area. (JD)

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RC 012733

ED 202646

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NATIONAL MIGRANT EDUCATION PROGRAM

MATH SKILLS

August 1979

The Math Skills List was developed in cooperation with the Migrant Branch of the United States Office of Education, the National Association of State Directors of Migrant Education, the Migrant Student Record Transfer System, and a committee of states which we gratefully acknowledge:

Arizona
California
Colorado
Florida
Idaho
Kansas
Michigan
New York
New Mexico
Oregon
Pennsylvania
Texas
Washington

Produced with funds provided through P.L. 93-380.

FOREWORD

This document contains a catalog of math skills typical of the K-9 grade range. The math skills list is an integral part of the migrant student skills system which is operated by the Migrant Student Record Transfer System and its users.

This catalog, whose content was developed by hundreds of educators across the United States, permits teachers to report math skills mastered and under study by migrant students. The reported skills become part of each student's record on the MSRTS and will thereby be available to teachers, aides, and tutors serving migrant students.

The skills list presented here is not intended to represent a curriculum or an implied learning sequence. This is not an exhaustive list of K-9 skills.

"The work upon which this publication is based was performed pursuant to contract 300-76-0090 with the U.S. Office of Education, Department of Health, Education, and Welfare. However, the opinions expressed herein do not necessarily reflect the position or policy of the U.S. Office of Education, and no official endorsement by the U.S. Office of Education should be inferred."

EXPLANATION OF TERMINOLOGY FOR MSRTS MATH OUTLINE

1. **AREA:** *An Area is a collection of skills under a particular discipline such as reading, math, etc.* Readiness, Number Meaning, Whole Numbers, Fractions, Decimals, Percent, Measurement, Geometry, Probability and Statistics, and Sets are the ten major **Areas.**

2. **TOPICS:** *A Topic is a collection of skills in one or more Subtopics.* The **Topics** are listed under the ten major **Areas** on the Math Outline.

3. **SUBTOPICS:** *A Subtopic is a collection of closely related skills.* All items listed under the **Topics** (in the manual) will be referred to as **Subtopics.**

4. **SKILLS:** *A Skill is a discrete and observable unit of student behavior.* All items listed under the **Subtopics** (in the manual) will be referred to as **Skills.**

The following page is a copy of the MSRTS MATH OUTLINE.

MSRTS MATH OUTLINE

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MSRTS TRANSMITTAL RECORD
DIRECTIONS AND SUGGESTED USE

GENERAL INFORMATION:

The MSRTS TRANSMITTAL RECORD is a reporting form designed to send educational information on migrant students. It can be used to continuously update a child's record. All update information will be sent through your terminal operator.

The MSRTS TRANSMITTAL RECORD, WHEN COMPLETED, IS INTENDED TO REFLECT YOUR PROFESSIONAL ASSESSMENT OF A STUDENT'S BASELINE FOR INSTRUCTION.

SENDING TEACHER:

1. Write the word MATH in the blank on the MSRTS Transmittal Record.
2. Circle what is, IN YOUR OPINION, the INSTRUCTIONAL LEVEL of the student.
3. Write the numbered code of the mastered skill under the heading SKILLS MASTERED if applicable.
4. Enter the date of mastery under the heading DATE MASTERED.
5. At the time a student withdraws, enter the numbered code of those skills under instruction below the heading SKILLS UNDER STUDY AT WITHDRAWAL.
6. Send or call this information to your terminal operator.

RECEIVING TEACHER:

1. When you receive the EDUCATIONAL RECORD from the MSRTS study it carefully.
2. Notice the INSTRUCTIONAL LEVEL as indicated by the former teacher.
3. Study the information recorded under SKILLS MASTERED, DATE MASTERED and SKILLS UNDER STUDY AT WITHDRAWAL.

THIS INFORMATION WILL BE HELPFUL IN DEVELOPING THE CHILD'S EDUCATIONAL PROGRAM.

MSRTS TRANSMITTAL RECORD

_____ SKILLS

GARCIA, JUAN M. 9876543
SCHOOL I.D. — XXXX
INSTRUCTIONAL LEVEL K(K-1) P(1-3) I(4-6) S(7-12)

SKILLS MASTERED DATE MASTERED SKILLS UNDER STUDY AT WITHDRAWAL

_____ SKILLS

GARCIA, JUAN M. 9876543
SCHOOL I.D. — XXXX
INSTRUCTIONAL LEVEL K(K-1) P(1-3) I(4-6) S(7-12)

SKILLS MASTERED DATE MASTERED SKILLS UNDER STUDY AT WITHDRAWAL

_____ SKILLS

GARCIA, JUAN M. 9876543
SCHOOL I.D. — XXXX
INSTRUCTIONAL LEVEL K(K-1) P(1-3) I(4-6) S(7-12)

SKILLS MASTERED DATE MASTERED SKILLS UNDER STUDY AT WITHDRAWAL

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READINESS

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READINESS

Recognition of Properties

SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
001 Color as a Property	00101	A. The word "color" B. Objects differentiated by color	Names a color Identifies color as the identifying characteristic	"Tell me a color." (Green) "How are these objects different?" (Color)
004 Shape as a Property	00401	A. The word "shape" B. Objects differentiated by shape	Names a shape Identifies shape as a differentiating characteristic	"Tell me a shape." (Square) "How are these objects different?" (Shape)
007 Dimension as a Property	00701	A. A description of dimensionality	Identifies object differentiated by 2-D vs 3-D	"A 2-D shape has length and width but no thickness. A 3-D object has all three." (Square: 2-D; box: 3-D)
		B. Objects differentiated by 2-D vs. 3-D	Names 2-D vs. 3-D as a differentiating characteristic	"What is the difference between a circle and a sphere?" (Circle is 2-D; sphere is 3-D)
		DIVISIONS WITHIN PROPERTIES		
010 Primary Colors	01001	A. Name of a primary color (red, blue, yellow) B. An object having a particular primary color	Identifies objects having a particular primary color Names the color	Red (truck) Red truck (red)
013 2-D Shapes	01301	A. Name of a 2-D shape (circle, square, rectangle, triangle) B. Objects having a particular 2-D shape	Identifies objects having that shape Names the (2-D) shape	Circle (points to circular piece of paper) Square piece of paper (square)

READINESS

DIVISIONS WITHIN PROPERTIES

SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
016 3-D Shapes	01601	A. Name of a 3-D shape (sphere, cube, cone)	Identifies objects having the shape	Sphere (points to sphere)
		B. Objects having a particular (3-D shape)	Names the (3-D) shape	"What is this?" (cone)
019 Line Segments Forming Shapes	01901	A. A 2-D shape	Identifies a line segment in the 2-D shape	"Show me a line segment." (Points to line segment in 2-D shape)
		B. A given number of line segments	Identifies the 2-D shape that can be constructed using the line segments	Three segments (triangle)
022 Angle Magnitude	02201	A. A number of angles formed with a single pair of equal line segments	Orders the angles by magnitude	Angles of 60°, 25°, 120° (orders by magnitude)
		B. A number of angles formed with a single pair of unequal line segments	Orders the angles by magnitude	Angles of 30°, 15°, 10° (orders by magnitude)
025 Real-World Shapes	02501	A. Real-world shapes	Names related symbolic geometric shapes	Stop sign (hexagon)
		B. Symbolic geometric shapes	Identifies related real-world shapes	Circle (clock face)

COMPARISONS WITHIN PROPERTIES

028 Simple Spatial Relations	02801	A. Name of a spatial relation (right-left/above-below/in-out/beside/in front-behind)	Identifies objects having the given spatial relation	"In front" (places rock in front of box)
		B. Objects having a given spatial relation (right-left/above-below/in-out/beside/in front-behind)	Names the spatial relation	Wooden block above table (above)

READINESS

COMPARISONS WITHIN PROPERTIES

SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
031 Simple Temporal Relations	03101	A. Name of a temporal relation (before, during, after)	Identifies events having a given temporal relation	"Before" (got up before going to school)
		B. An example of a temporal relation	Names the temporal relation	Bell rang—went to lunch (after)
034 Size Relations	03401	A. Name of a size (area) relation (small-large/smaller-larger/smallest-largest)	Identifies objects having a specified size relation	"Which piece of paper is larger than this one?"
		B. Objects having size (area) differences	Names a particular size (area) relation	Point to smallest; ask pupil to state relative size (smallest)
037 Weight Relations	03701	A. Name of a weight relation (light-heavy/lighter-heavier/lightest-heaviest)	Identifies objects having a specified weight relation	"Which book is the lightest?"
		B. Objects having weight differences	Names a particular weight relation	Point to the heaviest; ask pupil to state relative weight (heaviest)
040 Length Relations	04001	A. Name of a length relation (short-long/shorter-longer/shortest-longest)	Identifies objects having a specified length relation	"Which pencil is longer than this one?"
		B. Objects having length differences	Names the length relation	Select two objects; point to the longer one (longer)
043 Volume Relations	04301	A. Name of a volume relation (more-less/more full-less full/most full-least full)	Identifies specified volume relations	Same-shaped containers with different levels of liquid
		B. Differing volumes	Names a particular volume relation	"Which have more water than this one?"
046 Simple Ordinal Relations	04601	A. Name of an order relationship (first, last, between)	Identifies object (symbol) in specified ordinal position	Children standing in line; "Who is first?"
		B. Objects occupying a given relative position	Names relative (ordinal) position of object (symbol)	Children standing in line; "Where is Alice?"

READINESS

PARTITIONING (GROUPING)

SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
049 By Color	04901	A. Objects grouped by color	Names the color common to objects in a group	Red chips, blue chips, etc. "What color are these?"
		B. Name of one of the colors used in grouping objects	Identifies objects grouped by that color	"Which of the chips are red?"
052 By 2-D Shape	05201	A. Objects grouped by (2-D) shape (triangle, square, circle, rectangle)	Names the (2-D) shapes	Point to triangles; "What are those?"
		B. Name of one of shapes used in grouping objects	Identifies objects grouped by that (2-D) shape	Point to group of figures: "Show me a square."
055 By 3-D Shape	05501	A. Objects grouped by (3-D) shape (cone, cube, tetrahedron, cylinder)	Names the shape common to objects in a group	Point to cone; "What is this?"
		B. Names of one of the (3-D) shapes used in grouping objects	Identifies objects grouped by that (3-D) shape	Point to group of shapes; "Show me a sphere."

ORDERING

058 By Size (Area)	05801	A. Objects ordered by size (area)	Names "size" (area) as the ordering property	Paper squares of varying area; "How are these squares ordered?"
		B. That size (area) was used to order objects	Identifies the objects that were ordered by size (area)	Groups of objects each ordered by a different property; "Which objects are ordered by size?"
061 By Weight	06101	A. Objects ordered by weight	Names "weight" as the ordering property	Rocks of varying weight; "How are these rocks different?"
		B. That weight was used to order objects	Identifies objects ordered on weight	"Which objects are ordered by weight?"

READINESS

ORDERING

SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
064 By Length	06401	A. Objects ordered by length	Names "length" as the ordering property	Sticks of varying length; "How are these sticks different?"
		B. That length was used to order objects	Identifies objects ordered on length	"Which objects are ordered by length?"
067 By Volume	06701	A. Objects ordered by volume	Names "volume" as the ordering property	Containers of varying capacity; "How are these containers different?"
		B. That volume was used to order objects	Identifies quantities ordered on volume	"Which objects are ordered by volume?"

NUMBER MEANING

AREA--TOPIC		SUBTOPICS	PAGE(S)
1110	Number Meaning--Basic	070-079	8

	SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
070	Numerals and Associated Word Names	07001	A. The numerals 0-9 B. Word names "zero"... "nine"	Names the numerals Identifies the numerals corresponding to the word names	3(three) zero (0)
		07002	A. The numerals 10, 20, 30, ...100 B. Word names "ten," "twenty," ..."one hundred"	Names the numerals Identifies the numerals corresponding to the word names	40 (forty) seventy (70)
073	Signs (<,>,=) and Associated word Names	07301	A collection of pairs of whole numbers	Identifies, using the symbols "<," ">," "=," the relationship among the pairs of numbers	47 (__) 51 (<)
		07302	A. The symbols "=," "<" ">" B. Word names "equal to," "less than," and "greater than"	Names the symbols Identifies the symbols corresponding to the word names	< (less than) equal to (=)
076	Ordination	07601	A. A row of ten objects	Names the ordinal position (first, second...tenth) of a specified object	↓ . . . . . . (fourth)
			B. The name of an ordinal position (first, second ...(tenth)	Identifies object occupying the given ordinal position	seventh ↓ (. . . . . .)
079	Counting	07901	A. Arrays of the numerals 1-10	Identifies the array representing counting 1-10	1 2 3 4 5 6 7 8 9 10 (child associates numerals with counting sequence)
			B. Arrays of the numerals 1-100	Identifies the array representing counting 1-100	Same as 29a with numerals 1-100
			C. Arrays of the numerals 1-100,000	Identifies the array representing counting 1-100,000	Same as 29a with numerals 1-100,000

WHOLE NUMBERS

AREAS--TOPICS		SUBTOPICS	PAGE(S)
2110	Whole Numbers--Basic Characteristics	082-094	10-12
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2160	Whole Numbers--Applications	216-237	22-24

BASIC CHARACTERISTICS

SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
082 Place Value	08201	A single digit numeral (0-9)	Names the place value of the digit	3 (ones)
	08202 A.	A two digit numeral (10-99)	Names the place value of a given digit in the numeral	2̲9 (tens)
	B.	A place value name (ones, tens) and a two digit numeral	Identifies the digit in the numeral occupying that place	56-ones (6)
	08203 A.	A three digit numeral (100-999)	Names the place value of a given digit in the numeral	3̲75 (tens)
	B.	A place value name (ones, tens, or hundreds) and a three digit numeral	Identifies the digit occupying that place value	582-hundreds (5)
	08204 A.	A four digit numeral (1,000-9,999)	Names the place value of a given digit in the numeral	3̲798 (hundreds)
	B.	A place value name (ones, tens, hundreds, or thousands) and a four digit numeral	Identifies the digit occupying that place value	7203-tens (zero)
	08205 A.	A five (or more) digit numeral (10,000-...)	Names the place value of a given digit in the numeral	32,964 (ten thousands)
	B.	Place value names (ones, tens, hundreds, thousands, ten-thousands) and a five (or more) digit numeral	Identifies the digit occupying that place value	460,237-tens (3)
085 Expanded Notation	08501 A.	A two digit numeral	identifies an expanded notation form (using word names) of the two digit numeral	26= (2 tens + 6 ones)
	B.	A two digit numeral	Identifies an expanded notation form (using numerals) of the numeral	26= (20 + 6)
	C.	An expanded notation form (using word names) of a two digit numeral	Identifies the two digit numeral represented by the expanded notation form	forty + 6 = (46)

WHOLE NUMBERS

BASIC CHARACTERISTICS

SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
085 Expanded Notation (continued)	08502	A. A three digit numeral	Identifies an expanded notation form (using word names) of the numeral	327 = (three hundreds + two tens + seven)
		B. A three digit numeral	Identifies an expanded notation form (using numerals) of the numeral	417 = (400 + 10 + 7)
		C. An expanded notation form (using word names) of a three digit numeral	Identifies the three digit numeral represented by the expanded notation form	One hundred + seven tens + nine = (179)
	08503	A. A number greater than 1,000	Identifies an expanded notation form (using word names) of the number	6,037 = (six thousands + three tens + seven)
		B. A number greater than 1,000	Identifies an expanded notation form (using numerals) of the numeral	8,123 = (8,000 + 100 + 20 + 3)
		C. An expanded notation form (using word names) of a number greater than 1,000	Identifies the multi-digit numeral represented by the expanded notation form	Two thousand + three hundred + sixteen = (2,316)
088 Number Line	08801	A number line representation of the whole numbers 1 through 10, with numbers missing	Identifies one or more numbers missing from the number line	1 2 3 4 6 7 9 (5, 8, 10)
	08802	A number line	Identifies points on the number line representing the whole numbers (1 - 10)	0 (1 2 3 4 5 6 7 8 9 10)
	08803	Several positive and negative numbers and zero on a number line	Continues sequence in positive or negative directions	–2 –1 0 1 2 (–4, –3, 3, 4)
	08804	A. Unlabeled point in a sequence of labeled points on a rational number line	Names the point	0 1/4 1/2 / 1 (3/4)
		B. The name of a rational number and a rational number line	Identifies the point	0 1/2 5/6 1 Identify "1/3"

WHOLE NUMBERS

BASIC CHARACTERISTICS

	SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
088	Number Line (continued)	08805	A positive or negative whole number (—15 to +15)	Locates the point on a number line corresponding to the number	Locate —12 on the number line 0 ||||||||||||||||||||||||| (x)
091	Even/Odd Numbers	09101	A. A collection of numbers (between 1 and 1,000)	Names each number as "even" or "odd"	16 (even) ; 327 (odd)
			B. The names "even" or "odd" and a group of numbers	Identifies collection of numbers as even or odd	"Underline the odd numbers" (1, 46, 7, 257, 13, 6, . . .)
094	Composite/ Prime Numbers	09401	A. A definition of prime numbers	Identifies the correct definition of prime numbers	1. A prime number has only two factors. 2. A prime number has only one factor. (1st is correct)
			B. A list containing both prime and composite numbers	Identifies the prime numbers in the list	1, 3, 47, 8, 19, 21 (3, 47, 19)

ADDITION

097	Terms ("Sum," etc.) and Signs ("=")	09701	A. An example of an addition problem	Names the underlined part in the problem using the terms of addition	$4 + 7 = \underline{11}$ (sum)
			B. The names of terms used in addition (sum, addend)	Identifies the terms by locating appropriate numeral(s) in written addition problem	$6 + 4 = 10$, "sum" (10)
			C. The operation sign for addition	Names the sign	"+" (plus)
100	Associative Commutative Relations	10001	An example of an associative relation	Identifies example as an associative relation	$(3 + 5) + 8 = 3 + (5 + 8)$ (associative)
		10002	An example of a commutative relation	Identifies example as a commutative relation	$2 + 3 = 3 + 2$ (commutative)

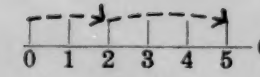
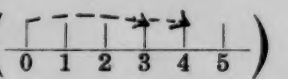
WHOLE NUMBERS

ADDITION

SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
103 Estimation of Column Addition	10301	An addition sentence with four or more addends and a missing sum	Identifies estimate of sum by rounding addends to nearest ten	$8 + 4 + 9 + 17 = ____$ (40)
	10302	An addition sentence with four or more addends and an estimated sum	Names the estimation technique (rounding by tens, hundreds, etc.) that was used	$32 + 8 + 11 + 23 = \underline{70}$ (rounding by tens)
106 Expanded Notation Form	10601	A. An addition sentence (involving no regrouping)	Identifies an expanded notation solution to the addition sentence	$22 + 7 =$ $(20 + 2 + 7 = 20 + 9 = 29)$
		B. An addition sentence (involving no regrouping) in expanded notation form	Identifies a number sentence corresponding to the expanded notation form	$40 + 3 + 5$ $(43 + 5)$
	10602	A. An addition sentence (involving regrouping)	Identifies an expanded notation solution to the number sentence	$22 + 7 =$ $(20 + 2 + 7 = 20 + 9 = 29)$
		B. An addition sentence (involving regrouping)	Identifies a number sentence corresponding to the expanded notation form	$40 + 6 + 7 = 40 + 13 = 53$ $(46 + 7)$
109 Using Word Names	10901	A. An addition number sentence using word names	Identifies the corresponding number sentence using numerals	Three plus six is nine $(3 + 6 = 9)$
		B. A number sentence using numerals	Identifies the corresponding number sentence using word names	$3 + 6 = 9$ (Three plus six is nine)
112 Vertical Form Addition	11201	A. An addition problem in vertical form	Identifies a corresponding repeated addition number sentence	$\begin{array}{r} 5 \\ +4 \\ \hline 9 \end{array}$ $(5 + 4 = 9)$
		B. An addition number sentence in horizontal form	Identifies a corresponding addition problem in vertical form	$7 + 2 = 9$ $\left(\begin{array}{r} 7 \\ +2 \\ \hline 9 \end{array}\right)$

WHOLE NUMBERS

ADDITION

SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
115 On a Number Line	11501	A. A number line representation of an addition number sentence	Identifies a corresponding number sentence	 (2 + 3 = 5)
		B. An addition number sentence	Identifies a number line expression of the number sentence	3 + 1 = 4 
118 Basic Addition Facts	11801	1 digit + 1 digit = sum less than 10	Identifies the sum	3 + 4 = ____ (7)
	11802	1 digit + 1 digit = sum greater than or equal to 10	Identifies the sum	8 + 8 = ____ (16)
121 Two Addends, No Regrouping	12101	2 digits + 1 digit	Identifies the sum	24 + 3 = ____ (27)
	12102	2 digits + 2 digits	Identifies the sum	33 + 12 = ____ (45)
	12103	2 digit multiple of 10 + 2 digit multiple of 10	Identifies the sum	40 + 50 = ____ (90)
	12104	3 digits + 3 digits	Identifies the sum	111 + 343 = ____ (454)
124 Two Addends, Regrouping	12401	2 digits + 1 digit	Identifies the sum	17 + 5 = ____ (22)
	12402	2 digits + 2 digits	Identifies the sum	47 + 26 = ____ (73)
	12403	2 digit multiple of 10 + 2 digit multiple of 10	Identifies the sum	60 + 80 = ____ (140)
	12404	3 digits (with 0 in tens place) + 2 digits	Identifies the sum	701 + 89 = ____ (790)
	12405	3 digits + 3 digits	Identifies the sum	628 + 937 = ____ (1,565)
127 Multiple Addends, Regrouping	12701	4 addends: Each addend is a multiple of 10 less than 100	Identifies the sum	70 + 20 + 50 + 90 = ____ (230)
	12702	4 addends: Each addend is a multiple of 100	Identifies the sum	1,600 + 100 + 500 + 8,000 = ____ (10,200)

WHOLE NUMBERS

ADDITION

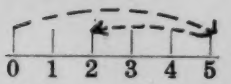
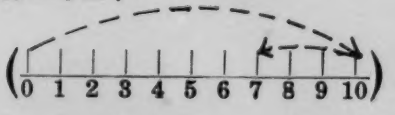
	SUBTOPICS			GIVEN	THE STUDENT	EXAMPLE
127	Multiple Addends, Regrouping (continued)	12703		4 addends with varying number of digits	Identifies the sum	$2{,}754 + 22 + 1{,}875 + 542 =$ ____ (5,193)

SUBTRACTION

130	Terms and Signs	13001	A.	The operation sign for subtraction	Names the sign	"—" (minus)
			B.	The names "minus" and "difference"	Identifies the minus sign and the difference	"Difference" $(5 \overset{(\downarrow)}{-} 3 = \underline{2})$
133	Vertical Form	13301	A.	A subtraction problem in vertical form	Identifies an equivalent number sentence	$\begin{array}{r} 8 \\ -3 \\ \hline 5 \end{array}$ $(8 - 3 = 5)$
			B.	A subtraction number sentence in horizontal form	Identifies the corresponding subtraction problem in vertical form	$6 - 3 = 3$ $\left(\begin{array}{r} 6 \\ -3 \\ \hline 3 \end{array}\right)$
137	As Inverse Addition	13701		An open number addition sentence with missing addend	Identifies the process for finding a solution to the sentence as subtraction	$8 +$ ____ $= 12$ "subtraction" or $(12 - 8 = 4)$
141	Expanded Notation Solution—No Regrouping	14101	A.	A subtraction number sentence	Identifies an expanded notation solution to the number sentence	$37 - 12 =$ ____ $(30 + 7 - 10 - 2 =$ ____$)$ $(30 - 10 + 7 - 2 =$ ____$)$ $(20 + 5 = 25)$
			B.	A subtraction number sentence in expanded notation form	Identifies the corresponding subtraction problem	$50 + 6 - 20 - 2 =$ ____ $50 - 20 + 6 - 2 =$ ____ $30 + 4 = 34$ $(56 - 22)$
144	Expanded Notation Solution—Regrouping	14401	A.	A subtraction number sentence	Identifies an expanded notation solution to the number sentence	$72 - 39 =$ ____ $(70 + 2 - 30 - 9 =$ ____$)$ $(60 + 12 - 30 - 9 =$ ____$)$ $(60 - 30 + 12 - 9 =$ ____$)$ $(30 + 3 = 33)$

WHOLE NUMBERS

SUBTRACTION

SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
144 Expanded Notation Solution—Regrouping (continued)	14401	B. An expanded notation solution to a subtraction problem	Identifies the corresponding subtraction problems	$40 - 20 + 13 - 7 =$ ____ $20 + 6 = 26$ $(53 - 27)$
147 Number Line Subtraction	14701	A. A number line representation of a subtraction number sentence	Identifies a subtraction number sentence corresponding to the number line representation	 $(5 - 3 = 2)$
		B. A subtraction number sentence	Identifies a number line expression of the subtraction number sentence	$10 - 3 = 7$ 
150 Using Word Names	15001	A. A subtraction number sentence using word names	Identifies the corresponding subtraction number sentence using numerals	Six minus four is two $(6 - 4 = 2)$
		B. A subtraction number sentence using numerals	Identifies the subtraction number sentence using word names	$7 - 2 = 5$ (Seven minus two is five)
153 Computation Involving No Regrouping	15301	1 digit — 1 digit	Computes difference	$9 - 3 =$ ____ (6)
	15302	2 digits — 1 digit	Computes difference	$18 - 3 =$ ____ (15)
	15303	2 digits — 2 digits	Computes difference	$47 - 34 =$ ____ (13)
	15304	3 digits — 3 digits	Computes difference	$875 - 521 =$ ____ (354)
	15305	3 digits — 3 digits (with 0 in tens place)	Computes difference	$594 - 203 =$ ____ (391)
	15306	4 digits — 3 digits	Computes difference	$5{,}743 - 321 =$ ____ (5,422)
156 Computation Involving Regrouping	15601	2 digits — 2 digits	Computes difference	$86 - 69 =$ ____ (17)
	15602	3 digits — 3 digits	Computes difference	$621 - 414 =$ ____ (207)
	15603	3 digits — 3 digits (two regroupings)	Computes difference	$455 - 378 =$ ____ (77)

WHOLE NUMBERS

SUBTRACTION

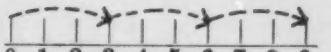
SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
156 Computation Involving Regrouping (continued)	15604	3 digits (with 1 in tens place) — 3 digits (two regroupings)	Computes difference	415 — 378 = ____ (37)
	15605	3 digits (with 0 in tens place) — 3 digits (two regroupings)	Computes difference	702 — 335 = ____ (367)
	15606	4 digits — 3 digits (two regroupings)	Computes difference	4,364 — 176 = ____ (4,188)
	15607	4 digits (with 0 in tens and hundreds place) — 3 digits (repeated regroupings)	Computes difference	6,004 — 525 = ____ (5,479)
	15608	6 digits or less — 6 digits or less (repeated regrouping)	Computes difference	672,145 — 18,976 = ____ (653,169)

MULTIPLICATION

159 Terms and Signs	15901	A. An example of a multiplication problem	Names the terms used in multiplication (factor; product)	$3 \times \underline{5} = 15$ (3 and 5 are products. 15 is the product.)
		B. The names of terms used in multiplication	Identifies the terms by locating appropriate numeral(s) in written multiplication problem	"product" $(4 \times 6 = 24)$
		C. The symbols for multiplication	Identifies the operation symbolized	"×," "•," no symbol as in "3(10)", "(4)(12)", (multiplication)
162 Vertical Form	16201	A multiplication problem in vertical form	Identifies a number sentence equivalent to the vertical multiplication problem	$\begin{array}{r} 7 \\ \times\ 2 \\ \hline 14 \end{array}$ $(7 \times 2 = 14)$
165 Represented as Physical Models	16501	A. An array of objects or dots	Identifies the corresponding multiplication problem	⋯⋯ ⋯⋯ ⋯⋯ $(3 \times 5 = 15)$
		B. A multiplication sentence involving whole numbers	Identifies an array (objects or pictures) representing the multiplication sentence	$2 \times 4 = 8$ $\begin{pmatrix} \cdots \\ \cdots \end{pmatrix}$

WHOLE NUMBERS

MULTIPLICATION

SUBTOPICS		GIVEN		THE STUDENT	EXAMPLE
168 Incomplete Multiplication Sentences	16801	A.	A multiplication sentence with a missing term or operation symbol	Identifies the missing term or operational symbol in the multiplication sentence	$5\ (_)\ 4 = 20 \quad (\times)$
		B.	A multiplication sentence involving whole numbers with the product missing	Identifies the product by estimation	$18 \times 11 = ____ \quad (20 \times 10 = 200)$
171 Repeated Addition Sentences	17101	A.	A multiplication problem involving two factors	Identifies a repeated addition sentence representing the multiplication problem	$3 \times 4 = ____$ $(4 + 4 + 4$ or $3 + 3 + 3 + 3)$
		B.	A repeated addition problem with identical addends	Identifies a number phrase representing the repeated addition sentence	$8 + 8 + 8 + 8 + 8 = \quad (5 \times 8)$
174 On a Number Line	17401	A.	A number line representation of a product	Identifies the multiplication sentence corresponding to the number line representation	 $(3 \times 3 = 9)$
		B.	A multiplication sentence	Identifies a number line representation of the multiplication sentence	$2 \times 5 = 10$
177 Distributive, Associative Commutative Relations	17701		An example of the distributive property	Identifies number sentence as an example of the distributive property	$8 \times (3 + 4) = (8 \times 3) + (8 \times 4)$ (Distributive)
	17702		An example of the associative property of multiplication	Identifies number sentence as an example of the associative property	$(3 \times 5) \times 8 = 3 \times (5 \times 8)$ (Associative)
	17703		An example of the commutative property of multiplication	Identifies number sentence as an example of the commutative property	$2 \times 3 = 3 \times 2$ (Commutative)
180 Basic Facts	18001		1 digit (0 - 9) $\times$ 1 digit (0 - 9)	Computes product	$3 \times 2 = ____ \quad (6)$

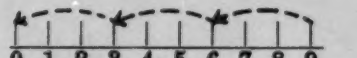
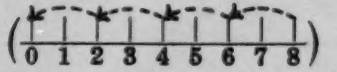
WHOLE NUMBERS

MULTIPLICATION

SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
183 Involving No Regrouping	18301	2 digits × 1 digit	Computes product	43 × 2 = ____ (86)
	18302	2 digits (multiple of ten) × 1 digit	Computes product	20 × 3 = ____ (60)
	18303	3 digits × 1 digit	Computes product	324 × 2 = ____ (648)
	18304	3 digits (zero in ones place) × 1 digit	Computes product	120 × 4 = ____ (480)
	18305	3 digits (multiple of 100) × 1 digit	Computes product	200 × 3 = ____ (600)
	18306	2 digits × 2 digits	Computes product	44 × 21 = ____ (924)
	18307	3 digits × 2 digits	Computes product	321 × 32 = ____ (10,272)
	18308	3 digits (zero in tens place) × 2 digits	Computes product	403 × 12 = ____ (4,836)
	18309	3 digits × 3 digits	Computes product	421 × 212 = ____ (89,252)
	18310	3 digits (zero in tens place) × 3 digits	Computes product	302 × 323 = ____ (97,546)
	18311	3 digits (multiple of 100) × 3 digits	Computes product	600 × 431 = ____ (258,600)
186 Involving Regrouping	18601	2 digits × 1 digit	Computes product	68 × 4 = ____ (272)
	18602	3 digits (zero in tens place) × 1 digit	Computes product	409 × 6 = ____ (2,454)
	18603	2 digits × 2 digits	Computes product	38 × 73 = ____ (2,774)
	18604	3 digits × 2 digits	Computes product	915 × 47 = ____ (43,005)
	18605	3 digits (zero in tens place) × 2 digits	Computes product	802 × 94 = ____ (75,388)
	18606	3 digits × 3 digits	Computes product	735 × 499 = ____ (366,765)
	18607	3 digits (zero in tens place) × 3 digits	Computes product	109 × 357 = ____ (38,913)

WHOLE NUMBERS

DIVISION

	SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
189	Terms and Signs	18901	A. An example of a division problem	Names the terms used in division (quotient, remainder)	② (quotient) 3 / 7 6 ① (remainder)
			B. The names of terms used in division	Identifies the terms by locating appropriate numeral(s) in written division problems	"remainder" 6 (2 / 13 12 ①)
			C. The symbols for division	Identifies the operation symbolized	"÷" "/" (division)
192	As Repeated Subtraction	19201	A repeated subtraction problem	Identifies the operational equivalent of division and subtraction	"How many 2's can you subtract from 8?" (4; thus $8 \div 2 = 4$)
194	As An Equivalent Multiplication Sentence	19401	A. A division fact or sentence	Identifies a multiplication fact or sentence equivalent to the division fact or sentence	$8 \div 4 = 2$ $(2 \times 4 = 8)$
			B. A multiplication fact or sentence	Identifies a division fact or sentence equivalent to the multiplication fact or sentence	$3 \times 5 = 15$ $(15 \div 5 = 3)$ or $(15 \div 3 = 5)$
196	On a Number Line	19601	A. A number line representation of a division fact	Identifies the division fact corresponding to the number line representation	 0 1 2 3 4 5 6 7 8 9 $(9 \div 3 = 3)$
			B. A division fact	Identifies a number line representation of the division fact	$8 \div 2 =$  0 1 2 3 4 5 6 7 8
198	As An Incomplete Division Sentence	19801	An open division sentence	Identifies the missing term or operational symbol in an incomplete division sentence	$10 \div ____ = 5$ (2)

WHOLE NUMBERS

DIVISION

SUBTOPICS		GIVEN		THE STUDENT	EXAMPLE
201	As Multiples of 10	20101	A division problem	Identifies the largest multiple of 10 which when multiplied by the divisor is less than or equal to the dividend	147 ÷ 6 = ____ (20)
204	Single Digit Divisor Dividend, Remainder = 0	20401	1 digit ÷ 1 digit	Computes quotient	8 ÷ 2 or 2 $\overline{)8}$ = ____ (4)
207	Single Digit Divisor and Dividend, Remainder > 0	20701	1 digit ÷ 1 digit	Computes quotient	7 ÷ 3 (2 R1)
210	Multiple Digit Divisor or Dividend, Remainder = 0	21001	2 digits ÷ 1 digit	Computes quotient	12 ÷ 4 = ____ (3)
		21002	2 digits ÷ 2 digits	Computes quotient	75 ÷ 25 = ____ (3)
		21003	2 digits (multiple of 10) ÷ 2 digits (multiple of 10)	Computes quotient	90 ÷ 30 = ____ (3)
		21004	3 digits ÷ 2 digits	Computes quotient	135 ÷ 15 = ____ (9)
		21005	More than 3 digits ÷ 3 digits	Computes quotient	1,135 ÷ 227 = ____ (5)
213	Multiple Digit Divisor or Dividend, Remainder > 0	21301	2 digits ÷ 1 digit	Computes quotient	16 ÷ 5 = ____ (3 R1)
		21302	2 digits ÷ 2 digits	Computes quotient	92 ÷ 13 = ____ (7 R1)
		21303	3 digits ÷ 2 digits	Computes quotient	623 ÷ 22 = ____ (28 R7)
		21304	More than 3 digits ÷ 3 digits	Computes quotient	3,325 ÷ 104 = ____ (31 R101)
		21305	More than 3 digits (zero tens or hundreds) ÷ 3 digits	Computes quotient	39,702 ÷ 367 = ____ (108 R66)

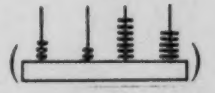
WHOLE NUMBERS

APPLICATIONS

SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
216 Addition Word Problems	21601	A. A word problem involving the addition of whole numbers	Identifies an addition procedure for solving the problem	"How many children are in a small country school where there are 28 first graders, 14 second graders and 30 third graders only?" (add 28, 14, and 30)
		B. A word problem involving the addition of whole numbers	Identifies an addition number sentence for solving the problem	(28 + 14 + 30 = ____)
		C. A word problem involving the addition of whole numbers	Identifies the answer to the problem	(72)
219 Subtraction Word Problems	21901	A. A word problem involving the subtraction of whole numbers	Identifies a subtraction procedure for solving the problem	"There are 36 children in a classroom. 18 are girls. How many boys are there?" (subtract 18 from 36)
		B. A word problem involving the subtraction of whole numbers	Identifies a subtraction number sentence for solving the problem	(36 — 18 = ____)
		C. A word problem involving the subtraction of whole number	Identifies the answer to the problem	(18)
222 Multiplication Word Problems	22201	A. A word problem involving the multiplication of whole numbers	Identifies a multiplication procedure for solving the problem	"An apple orchard has 12 rows of trees with 8 trees in each row. How many trees are in the orchard? (multiply 8 by 12)
		B. A word problem involving the multiplication of whole numbers	Identifies a multiplication number sentence for solving the problem	(8 x 12 = ____)
		C. A word problem involving the multiplication of whole numbers	Identifies the answer to the problem	(96)
225 Division Word Problems	22501	A. A word problem involving the division of whole numbers	Identifies a division procedure for solving the problem	"A farmer wants to put all 40 of his sheep in 8 pens. If he puts the same number of sheep in each pen, how many will there be in each pen?" (divide 40 by 8)

WHOLE NUMBERS

APPLICATIONS

SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
225 Division Word Problems (continued)	22501	B. A word problem involving the division of whole numbers	Identifies a division number sentence for solving the problem	$(40 \div 8 = ____)$
		C. A word problem involving the division of whole numbers	Identifies the answer to the problem	(5)
228 Addition Using Devices	22801	A number greater than 1,000	Identifies an abacus (or similar device) representation of the number greater than 1,000	3,275 
231 Addition as Patterns	23101	A. An incomplete pattern of whole numbers generated by an operation of addition or subtraction	Identifies a missing whole number	2, 4, 6, 8, ____ (10)
		B. A complete pattern of whole numbers generated by an operation of addition or subtraction	Identifies the operation needed to generate the pattern	25, 20, 15, 10, 5, 0 (subtraction of 5)
	23102	Two whole numbers	Identifies a rational number between the two rational numbers	167, 173 (168, 169, 170, 171 or 172)
	23103	An incomplete Pascal's triangle	Identifies a missing number in the incomplete triangle	1 1 1 1 2 1 1 3 3 1 1 4 6 __ 1 (4)
234 Mixed Operations (+, —, ×, ÷) Word Problems	23401	A. A word problem involving mixed operations (+, —, ×, ÷) on whole numbers	Identifies an arithmetic procedure for solving the problem	For Christmas Lucy got \$5 from her uncle and \$14 from her grandmother. After she spent \$7 on a new blouse she put the money into two savings accounts, the same amount in each account. How much did Lucy put in each account?" (add 5 and 14, subtract 7, divide result by 2)

WHOLE NUMBERS

APPLICATIONS

SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
234 Mixed Operations Word Problems (continued)	23401	B. A word problem involving mixed operations (+, —, ×, ÷) on whole numbers	Identifies a number sentence for solving the problem	[(5 + 14 — 7) ÷ 2 = ____]
		C. A word problem involving mixed operations (+, —, ×, ÷) on whole numbers	Identifies the answer to the problem	($6)
237 Unfinished Numbers	23701	A 2-digit number with the ones place blank	Identifies a digit which (if placed in the ones places) makes the number divisible by 3	5____ (1, 4, 7)
	23702	A 3-digit number with the ones place blank	Identifies a digit which (if placed in the ones place) makes the number divisible by 4	14____ (0, 4, 8)
	23703	A 2-digit number with the ones place blank	Identifies a digit which (if placed in the ones place) makes the number divisible by 6	7____ (2, 8)
	23704	A 3-digit number with the ones place blank	Identifies a digit which (if placed in the ones place) makes the number divisible by 9	25____ (2)
	23705	A whole number	Identifies numbers which can be divided evenly into the given number	1,236 (2, 3, 4, 6)

55

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FRACTIONS

AREA--TOPICS	SUBTOPICS	PAGE(S)
3110 Fractions--Basic Characteristics	243-258	26-27
3120 Fractions--Equivalent Fractions	261-264	27-28
3130 Fractions--LCM and GCF	267-270	28
3140 Fractions--Addition	273-282	29-31
3150 Fractions--Subtraction	285-294	32-35
3160 Fractions--Multiplication	297-315	35-37
3170 Fractions--Division	318-327	37-38
3180 Fractions--Applications	330-342	38-40

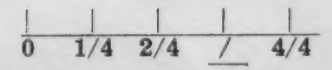
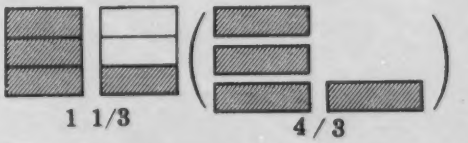
FRACTIONS

BASIC CHARACTERISTICS

SUBTOPICS			GIVEN	THE STUDENT	EXAMPLE
243	Terms	24301 A.	The terms "numerator" and "denominator"	Identifies the corresponding parts of a fraction	"Numerator" (→3/4)
		B.	A fraction	Names the parts of the fraction	1/3 (numerator is 1; denominator is 3)
246	Congruency of Shapes	24601	Shapes divided into congruent parts and divided into noncongruent parts	Identifies shapes as being divided into either congruent or noncongruent parts and shapes	(Congruent Parts) (Noncongruent Parts)
249	Physical Representations	24901	Objects or shapes divided into two, three, or four congruent parts	Names the whole as "two-halves," "three-thirds," or "four-fourths" and names the parts "one-half," "one-third," or "one-fourth"	(Halves) (Thirds) (Fourths)
		24902	An object or shape divided into two, three, or four congruent parts with one or more of the parts shaded or otherwise identified	Identifies the fraction corresponding to the shaded part of the (whole) shape or object	(1/2) (1/4)
		24903	A fraction (1/2, 1/3, or 1/4)	Identifies the part of a whole shape or object corresponding to the fraction	1/3
		24904	A shape or object divided into two, three, or four congruent parts	Identifies the numerator of a fraction as describing a number of parts and the denominator as describing the total parts in the whole	2/3
		24905	A fraction	Identifies the parts of a shape or object described by the numerator and the denominator	3/4

FRACTIONS

BASIC CHARACTERISTICS

SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
249 Physical Representations of Fractions (continued)	24906	A number line marked by a sequence of fractions (with one missing) with the same denominator	Identifies the missing fraction	 (3/4)
252 Identification of Mixed vs. Improper Fractions	25201	Figures representing an improper fraction	Identifies a figure representing the fraction in mixed numeral form	5/4 1 1/4
255 Physical Representations of Mixed Number Fractions	25501	Areas representing fractions in mixed numeral form (wholes and fractional parts)	Identifies a figure representing the corresponding improper fraction	 1 1/3 4/3
258 Ordering Fractions	25801	A collection of fractions with like denominators	Places the fractions in order from smallest to largest	1/6, 5/6, 3/6 (1/6, 3/6, 5/6)
	25802	A collection of fractions with units as numerators and unlike denominators	Places fractions in order from largest to smallest	1/4, 1/2, 1/6 (1/2, 1/4, 1/6)
	25803	A collection of fractions with numerators greater than one and unlike denominators	Places fractions in order from smallest to largest)	3/7, 3/4, 2/3 (3/7, 2/3, 3/4)

EQUIVALENT FRACTIONS

261 Prime Factoring	26101	A. A composite number	Identifies the prime factorization of the number	$60 =$ $(2 \times 2 \times 3 \times 5)$
		B. A prime factorization	Names the composite number represented by the prime factorization	$5 \times 3 \times 7 \times 2 =$ (210)

FRACTIONS

EQUIVALENT FRACTIONS

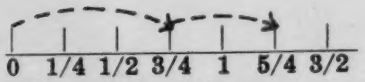
SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
264 Simplifying Fractions	26401	A. A proper (reduced) fraction	Identifies three fractions equivalent to the given fraction	3/4 (6/8, 9/12, 12/16)
		B. A proper (nonreduced) fraction	Identifies an equivalent, reduced fraction	10/15 (2/3)
	26402	A. An improper (reduced) fraction	Identifies three fractions equivalent to the given fraction	7/4 (14/8, 21/12, 28/16)
		B. An improper (nonreduced) fraction	Identifies an equivalent, reduced fraction	18/8 (9/4)
	26403	A. A mixed (reduced) fraction	Identifies three fractions equivalent to the given fraction	1 1/2 (6/4, 9/6, 12/8)
		B. A mixed (nonreduced) fraction	Identifies an equivalent, reduced fraction	8 4/6 (8 2/3 or 26/3)

LCM AND GCF

267 Least Common Multiple (LCM)	26701	A. Two whole numbers less than 10 such that LCM is either of the numbers	Finds the least common multiple	4, 8 (8)
		B. Three or more whole numbers such that LCM is any of the numbers	Finds the least common multiple	4, 8, 16 (16)
270 Greatest Common Factor (GCF)	27001	Two whole numbers such that the GCF is equal to one of the numbers	Finds the greatest common factor	12, 36 (12)
	27002	Two whole numbers such that that GCF is not either of the numbers	Finds the greatest common factor	15, 25 (5)
	27003	Two prime numbers	Finds the greatest common factor	43, 23 (1)
	27004	Three or more whole numbers	Finds the greatest common factor	8, 18, 24 (2)

FRACTIONS

ADDITION

SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
273 Number Line Representation	27301	A number line representation of addition of fractions with like denominators	Identifies the number sentence corresponding to the number line representation	 0 1/4 1/2 3/4 1 5/4 3/2 (3/4 + 2/4 = 5/4)
	27302	A number line representation of addition of fractions with like denominators	Identifies sum (in simplest terms)	(5/4 or 1 1/4)
276 Like Denominators	27601	Each addend is proper, the denominators are equal, and each numerator equals 1	Computes the sum	1/5 + 1/5 = ____ (2/5)
	27602	Each addend is proper, the denominators are equal, and each numerator is greater than 1	Computes the sum	3/7 + 2/7 = ____ (5/7)
	27603	One addend is proper, one is improper, and the denominators are equal	Computes the sum	5/3 + 1/3 = ____ (6/3 or 2)
	27604	One addend is proper, one is mixed, and the denominators are equal	Computes the sum	2/3 + 1 1/3 = ____ (6/3, 2, or 1 3/3)
	27605	Both addends are improper and the denominators are equal	Computes the sum	5/4 + 7/4 = ____ (12/4 or 3)
	27606	Both addends are mixed, the denominators are equal, and each numerator is 1	Computes the sum	1 1/4 + 3 1/4 = ____ (4 2/4 or 4 1/2)
	27607	Both addends are mixed, the denominators are equal, and each numerator is greater than 1	Computes the sum	5 2/7 + 11 3/7 = ____ (16 5/7)

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FRACTIONS

ADDITION

SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
279 Unlike Denominators —Least Common Denominator Is One of the Denominators (LCD)	27901	Each addend is proper, the denominators are unequal, each numerator equals 1, and LCD is one of the denominators	Computes the sum	1/3 + 1/6 = ____ (3/6 or 1/2)
	27902	Each addend is proper, the denominators are unequal, each numerator is greater than 1, and LCD is one of the denominators	Computes the sum	2/5 + 3/10 = ____ (7/10)
	27903	One addend is proper, one is improper, the denominators are unequal, and LCD is one of the denominators	Computes the sum	3/4 + 9/8 = ____ (15/8 or 1 7/8)
	27904	One addend is proper, one is mixed, the denominators are unequal, and LCD is one of the denominators	Computes the sum	3/4 + 3 1/8 = ____ (31/8 or 3 7/8)
	27905	Both addends are improper, the denominators are unequal, and LCD is one of the denominators	Computes the sum	3/2 + 5/4 = ____ (11/4 or 2 3/4)
	27906	One addend is improper, one is mixed, the denominators are unequal, and LCD is one of the denominators	Computes the sum	5/4 + 1 3/8 = ____ (2 5/8 or 21/8)
	27907	Both addends are mixed, the denominators are unequal, each numerator is 1, and LCD is one of the denominators	Computes the sum	2 1/6 + 8 1/12 = ____ (10 3/12 or 10 1/4)
	27908	Both addends are mixed, the denominators are unequal; each numerator is greater than 1, and LCD is one of the denominators	Computes the sum	6 2/3 + 9 5/6 = ____ (16 1/2)

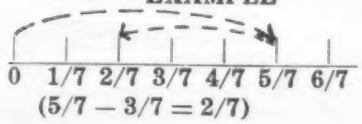
FRACTIONS

ADDITION

SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
282 Unlike Denominators LCD Is Neither Denominator	28201	Each addend is proper, the denominators are unequal, each numerator equals 1, and LCD is neither of the denominators	Computes the sum	$1/2 + 1/3 =$ ____ (5/6)
	28202	Each addend is proper, the denominators are unequal, each numerator is greater than 1, and LCD is neither of the denominators	Computes the sum	$4/5 + 2/3 =$ ____ (22/15 or 1 7/15)
	28203	One addend is proper, one is improper, the denominators are unequal, and LCD is neither of the denominators	Computes the sum	$5/3 + 3/7 =$ ____ (44/21 or 2 2/21)
	28204	One addend is proper, one is mixed, the denominators are unequal, and LCD is neither of the denominators	Computes the sum	$3/7 + 2\ 1/2 =$ (2 13/14 or 41/14)
	28205	Both addends are improper, the denominators are unequal, and LCD is neither of the denominators	Computes the sum	$7/3 + 6/5 =$ ____ (53/15 or 3 8/15)
	28206	One addend is improper, one is mixed, the denominators are unequal, and LCD is neither of the denominators	Computes the sum	$5/3 + 1\ 3/4 =$ ____ (41/12 or 3 5/12)
	28207	Both addends are mixed, the denominators are unequal, each numerator is 1, and LCD is neither of the denominators	Computes the sum	$21\ 1/5 + 15\ 1/2 =$ ____ (36 7/10)
	28208	Both addends are mixed, the denominators are unequal, each numerator is greater than 1, and LCD is neither of the denominators	Computes the sum	$12\ 3/7 + 15\ 4/5 =$ ____ (28 8/35)

FRACTIONS

SUBTRACTION

SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
285 Number Line Representation	28501	A number line representation of the subtraction of like fractions	Identifies a number sentence corresponding to the number line representation	 (5/7 − 3/7 = 2/7)
	28502	A number line representation of the subtraction of like fractions	Identifies the difference (in simplest terms)	(2/7)
288 Like Denominators	28801	Both fractions are proper, and the denominators are equal	Computes the difference	3/5 — 2/5 = ____ (1/5)
	28802	The first fraction is improper, the second is proper, and the denominators are equal	Computes the difference	7/3 — 2/3 = ____ (5/3)
	28803	The first fraction is mixed, the second is proper, and the denominators are equal (no borrowing)	Computes the difference	4 3/5 − 1/5 = ____ (4 2/5)
	28804	Both fractions are improper and the denominators are equal	Computes the difference	7/5 — 6/5 = ____ (1/5)
	28805	One fraction is improper, one is mixed, and the denominators are equal	Computes the difference	7/3 − 1 1/3 = ____ (3/3 or 1)
	28806	Both fractions are mixed and the denominators are equal	Computes the difference	3 1/2 − 2 1/2 = ____ (1)
291 Unlike Denominators LCD Is One Denominator	29101	Both fractions are proper, and the denominators are unequal, and LCD is one of the denominators	Computes the difference	7/8 — 1/4 = ____ (5/8)

FRACTIONS

SUBTRACTION

SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
291 Unlike Denominators LCD Is One Denominator (continued)	29102	The first fraction is improper, the second is proper, the denominators are unequal, and LCD is one of the denominators	Computes the difference	11/9 — 2/3 = ____ (5/9)
	29103	The first fraction is mixed, the second is proper, the denominators are unequal, and LCD is one of the denominators (no borrowing)	Computes the difference	3 1/2 — 1/8 = ____ (3 3/8)
	29104	The first fraction is mixed, the second is proper, the denominators are unequal, and LCD is one of the denominators (borrowing)	Computes the difference	4 1/2 — 3/4 = ____ (3 3/4)
	29105	Both fractions are improper, the denominators are unequal, and LCD is one of the denominators	Computes the difference	12/5 — 13/10 = ____ (11/10)
	29106	The first fraction is mixed, the second is improper, the denominators are unequal, and LCD is one of the denominators	Computes the difference	3 1/2 — 13/10 = ____ (2 2/10, 2 1/5)
	29107	Both fractions are mixed, the denominators are unequal, and LCD is one of the denominators (no borrowing)	Computes the difference	17 3/5 — 12 1/10 = ____ (5 5/10 or 5 1/2)
	29108	Both fractions are mixed, the denominators are unequal, and LCD is one of the denominators (borrowing)	Computes the difference	20 1/21 — 7 1/7 = (12 19/21)

FRACTIONS

SUBTRACTION

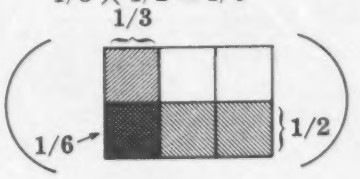
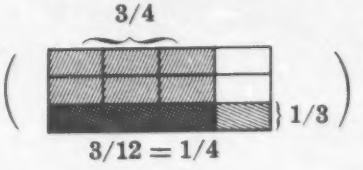
SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
294 Unlike Denominators LCD Is Neither Denominator	29401	Both fractions are proper, the denominators are unequal, and LCD is neither of the denominators	Computes the difference	5/6 — 3/5 = ____ (7/30)
	29402	The first fraction is improper, the second is proper, the denominators are unequal, and LCD is neither of the denominators	Computes the difference	13/9 — 1/5 = ____ (56/45)
	29403	The first fraction is mixed, the second is proper, the denominators are unequal, and LCD is neither of the denominators (no borrowing)	Computes the difference	8 1/2 — 1/9 = ____ (8 7/18)
	29404	The first fraction is mixed, the second is proper, the denominators are unequal, and LCD is neither of the denominators (borrowing)	Computes the difference	14 2/3 — 4/5 = ____ (13 13/15)
	29405	Both fractions are improper, the denominators are unequal, and LCD is neither of the denominators	Computes the difference	4/3 — 8/7 = ____ (4/21)
	29406	One fraction is improper, one is mixed, the denominators are unequal, and LCD is neither of the denominators	Computes the difference	4 1/3 — 5/4 = ____ (3 1/12)
	29407	Both fractions are mixed, the denominators are unequal, and LCD is neither of the denominators (no borrowing)	Computes the difference	2 1/2 — 1 1/7 = ____ (1 5/14)

FRACTIONS

SUBTRACTION

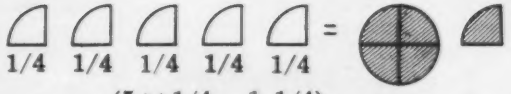
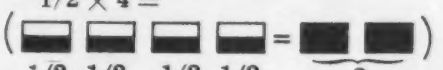
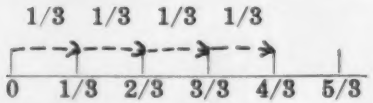
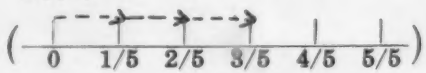
SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
294 Unlike Denominators —LCD Is Neither Denominator (continued)	29408	Both fractions are mixed, the denominators are unequal, and LCD is neither of the denominators (borrowing)	Computes the difference	$256\ 1/10 - 139\ 2/3 =$ ____ (116 13/30)

MULTIPLICATION

297 Terms and Signs	29701	A. A multiplication sentence using the symbol "×"	Identifies an equivalent multiplication sentence using the term "of"	$1/2 \times 1/5$ (1/2 of 1/5)
		B. A multiplication sentence using the symbol "of"	Identifies an equivalent multiplication sentence using the symbol "×"	3/4 of 1/3 ($3/4 \times 1/3$)
300 Area Representations of Multiplication of Fractions	30001	A. A multiplication sentence involving unit fractions	Identifies an area model corresponding to the multiplication sentence involving unit fractions	$1/3 \times 1/2 = 1/6$ 
		B. A multiplication sentence using the term "of"	Identifies an area model corresponding to the multiplication sentence	3/4 of 1/3 = 3/12 

FRACTIONS

MULTIPLICATION

SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
300 Area Representations of Multiplication of Fractions (continued)	30002	An area representation of a whole number multiplied by a unit fraction	Identifies the corresponding multiplication sentence	 (5 × 1/4 = 1 1/4)
	30003	A multiplication sentence involving a whole number and a unit fraction	Identifies an area model corresponding to the multiplication sentence	1/2 × 4 = 
303 Number Line Representations of Multiplication of Fractions	30301	A. A number line representation of a whole number multiplied by a unit fraction	Identifies the corresponding multiplication sentence	 (4 × 1/3 = 4/3)
		B. A multiplication sentence involving a whole number and a unit fraction	Identifies a number line representation corresponding to the multiplication sentence involving a whole number and a unit fraction	3 × 1/5 = 
306 Reciprocals	30601	A proper fraction	Identifies reciprocals	1/6 (6/1)
	30602	An improper fraction	Identifies reciprocals	7/3 (3/7)
	30603	A mixed number	Identifies reciprocals	2 1/3 (3/7)
309 Proper × Proper	30901	Both fractions are proper, denominators are less than 10—no cancellation possible	Computes product	2/3 × 5/7 = ____ (10/21)
	30902	Three fractions, all proper—no cancellation possible	Computes product	1/3 × 4/5 × 2/7 = ____ (8/105)

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FRACTIONS

MULTIPLICATION

SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
309 Proper × Proper (continued)	30903	Both fractions are proper—cancellation possible	Computes product	3/4 × 8/9 = ____ (2/3)
	30904	All three are proper fractions—cancellation possible	Computes product	1/3 × 6/5 × 15/18 = ____ (1/3)
312 Whole Number × Fraction	31201	One is whole number, the other is proper fraction—no cancellation possible	Computes product	5/9 × 16 = ____ (8 8/9 or 80/9)
315 Mixed Number × Fraction	31501	One is mixed number, the other is proper fraction—no cancellation possible	Computes product	2 2/3 × 1/3 = ____ (8/9)
	31502	Three numbers (any combination of proper or improper fractions, mixed numbers, or whole numbers)—no cancellation possible	Computes product	1/5 × 3 × 3 1×7 =____ (66/35 or 1 31/35)
	31503	Three numbers (any combination of proper or improper fractions, whole numbers, or mixed numbers)—cancellation possible	Computes product	5 1/2 × 8/3 × 9/4 = ____ (33)

DIVISION

318 Proper ÷ Proper	31801	Proper fractions having like denominators	Computes product	5/6 ÷ 1/6 = ____ (5)
	31802	Proper fractions having unlike denominators—no cancellation possible	Computes quotient	4/7 ÷ 5/6 = ____ (24/35)
	31803	The fractions are proper or improper—cancellation possible	Computes quotient	6/8 ÷ 3/16 = ____ (4)

FRACTIONS

DIVISION

SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
321 Proper and Mixed	32101	First is mixed, second proper	Computes quotient	$5\ 3/12 \div 1/4 =$ ____ (21)
	32102	First is proper, second is mixed	Computes quotient	$1/4 \div 2\ 1/6 =$ ____ (3/26)
324 Proper and Whole Numbers	32401	First is whole, second is proper	Computes quotient	$3 \div 1/3 =$ ____ (9)
	32402	First is proper, second is whole	Computes quotient	$5/7 \div 12 =$ ____ (5/84)
327 Mixed and Mixed	32701	Both fractions are mixed	Computes quotient	$7\ 1/3 \div 2\ 1/5 =$ ____ (10/3 or 3 1/3)

APPLICATIONS

330 Addition Word Problems	33001	A. A word problem involving the addition of fractions	Identifies addition procedure for solving the problem	"David ate 1/6 of a pie for lunch and 1/4 for dinner. What part of the pie did he eat altogether?" (add 1/6 and 1/4)
		B. A word problem involving the addition of fractions	Identifies an addition number sentence for solving the problem	($1/6 + 1/4 =$ ____)
		C. A word problem involving the addition of fractions	Identifies the answer to the problem	(5/12)
333 Subtraction Word Problems	33301	A. A word problem involving the subtraction of fractions	Identifies a subtraction procedure for solving the problem	"An insect is 7/8" long. Its head measures 1/5". How long is the rest of the insect?" (subtract 1/5 from 7/8)
		B. A word problem involving the subtraction of fractions	Identifies a subtraction number sentence for solving the problem	($7/8 - 1/5 =$ ____)
		C. A word problem involving the subtraction of fractions	Identifies the answer to the problem	(27/40")

FRACTIONS

APPLICATIONS

SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
336 Multiplication Word Problems	33601	A. A word problem involving the multiplication of fractions	Identifies a multiplication procedure for solving the problem	"Judy brought a piece of rope 23 1/2 yards long to make a macrame hanging. If she used 3/4 of the rope, how many yards did she use?" (multiply 23 1/2 by 3/4)
		B. A word problem involving the multiplication of fractions	Identifies a multiplication number sentence for solving the problem	(23 1/2 × 3/4 = ____)
		C. A word problem involving the multiplication of fractions	Identifies the answer to the problem	(17 5/8 yards)
339 Division Word Problems	33901	A. A word problem involving the division of fractions	Identifies a division procedure for solving the problem	"Raul's pencil is only 1 1/2 inches long. It is 3/8 as long as it was when it was new. How long was the pencil wher it was new?" (divide 1 1/2 by 3/8)
		B. A word problem involving the division of fractions	Identifies a division number sentence for solving the problem	(1 1/2 ÷ 3/8 = ____)
		C. A word problem involving the division of fractions	Identifies the answer to the problem	(4")
342 Mixed Operations Word Problems	34201	A. A word problem involving mixed operations (+, —, ×, ÷) with fractions	Identifies an arithmetic procedure for solving the problem	"Mrs. Smith baked a pie and cut it into six equal pieces. Johnny ate one piece, Mr. Smith ate two pieces, and Susie ate a third of a piece. What part of the pie was left?" (add amount Johnny, Mr. Smith, and Susie ate; subtract the result from 1)

FRACTIONS

APPLICATIONS

SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
342 Mixed Operations Word Problems (continued)	34201	B. A word problem involving mixed operations (+, —, ×, ÷) with fractions	Identifies a number sentence for solving the problem	$(1 - \{1/6 + 2/6 + (1/3 \times 1/6)\} = ____)$
		C. A word problem involving mixed operations (+, —, ×, ÷) with fractions	Identifies the answer to the problem	(4/9)

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DECIMALS

AREA--TOPICS		SUBTOPICS	PAGE(S)
4110	Decimals--Basic Characteristics	351-354	42-43
4120	Decimals--Conversions	357-366	43
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DECIMALS

BASIC CHARACTERISTICS

SUBTOPICS			GIVEN	THE STUDENT	EXAMPLE
351 Place Value to 100,000th	35101		A single digit decimal numeral (.1 - .9)	Names the place value of the digit	.3 (tenths)
	35102	A.	A two digit decimal numeral (.01 - .99)	Names the place value of a specified digit	.3<u>7</u> (hundredths)
		B.	A place value name (tenths, hundredths) and a two digit decimal numeral (.01-.99)	Identifies the digit occupying the given place	Tenths - .78 (7)
	35103	A.	A three digit decimal numeral (.001-.999)	Names the place value of a specified digit in the numeral	.36<u>7</u> (thousandths)
		B.	A place value name (tenths, hundredths, thousandths) and a three digit decimal numeral (.001-.999)	Identifies the digit occupying the given place	Thousandths-.03<u>5</u> (6)
	35104	A.	A four digit decimal numeral (.0001-.9999)	Names the place value of a specified digit in the numeral	.126<u>3</u> (thousandths)
		B.	A place value name (tenths, hundredths, thousandths, ten thousandths) and a four digit decimal numeral (.0001 - .9999)	Identifies the digit occupying the given place	Ten thousandths - 1234 (4)
	35105	A.	A decimal numeral with five or more places to the right of the decimal	Names the place value of a specified digit in the numeral	.62789<u>1</u> (millionths)
		B.	A place value name (tenths, hundredths,...) and a decimal numeral with five or more places to the right of the decimal	Identifies the digit occupying that place	Hundredths-.80762 (0)
	35106		A decimal numeral of no more than six places to the right of the decimal	Names the numeral verbally	.1362 (One thousand three hundred sixty-two ten thousandths)

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DECIMALS

BASIC CHARACTERISTICS

SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
354 Rounding	35401	A decimal fraction	Identifies the value of the decimal fraction rounded to the nearest hundredth, tenth, etc.	.249 (.25, .2)

CONVERSIONS

357 Equivalent Decimals	35701	A decimal fraction	Converts to an equivalent decimal fraction	.3 (.30) others answers possible
360 Fractions to Decimals	36001	A mixed numeral (fraction form) where the denominator is 10	Converts to a decimal fraction	3 4/10 (3.4)
	36002	A fraction whose denominator is 100	Converts to a decimal fraction	9/100 (.09)
	36003	A fraction whose denominator is a factor of 100	Converts to a decimal fraction	3/20 (.15)
	36004	A fraction whose denominator is a factor of 10, 100, 1,000	Converts to a decimal fraction	3/4 (.75)
	36005	A fraction whose denominator is not a factor of 10, 100, 1,000 . . .	Converts to a decimal fraction	8/9 (.888 . . . , or $.\overline{8}$)
	36006	A mixed numeral (fraction form) where the denominator is a factor of 10, 100, 1,000, . . .	Converts to a fraction	25 5/8 (25.625)
363 Decimals to Fractions	36301	A one-place decimal fraction	Converts to a fraction	.5 (5/10 or 1/2)
	36302	A two-place decimal fraction	Converts to a fraction	.25 (25/100 or 1/4)
	36303	A mixed decimal fraction	Converts to a fraction	5.631 (5,631/1,000)
366 Repeating Decimals to Fraction	36601	A repeating decimal fraction (.3 or .6)	Converts to a fraction	$.\overline{3}$ (1/3)
	36602	A mixed repeating decimal fraction	Converts to a fraction	$5.\overline{6}$ (5 2/3)

DECIMALS

ADDITION

	SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
369	Even, No Regrouping	36901	Both addends are in tenths	Computes the sum	.2 + .6 = ____ (.8)
		36902	Both addends are in units and tenths	Computes the sum	2.5 + 3.4 = ____ (5.9)
372	Uneven, No Regrouping	37201	One addend is in hundredths, one addend is in tenths	Computes the sum	.48 + .2 = ____ (.68)
375	Even, Regrouping	37501	Both addends are in hundredths	Computes the sum	.17 + .58 = ____ (.75)
		37502	Both addends are in units and tenths	Computes the sum	25.4 + 37.9 = ____ (63.3)
378	Uneven, Regrouping	37801	One addend is in hundredths, one addend is in tenths	Computes the sum	.6 + .73 = ____ (1.33)
		37802	One addend is in units and hundreths, one addend is in tenths	Computes the sum	25.69 + .8 = ____ (26.49)

SUBTRACTION

381	Even, No Regrouping	38101	Both decimal fractions in tenths	Computes the difference	.8 — .2 = ____ (.6)
		38102	Both decimal fractions in units and tenths	Computes the difference	6.3 — 2.2 = ____ (4.1)
		38103	Both decimal fractions in hundredths	Computes the difference	.09 — .04 = ____ (.05)
		38104	Both decimal fractions in units and hundredths	Computes the difference	23.18 — 12.06 = ____ (11.12)
384	Uneven, No Regrouping	38401	One decimal fraction in units and hundredths, one in tenths	Computes the difference	14.89 — .7 = ____ (14.19)

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DECIMALS

SUBTRACTION

SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
387 Even, Regrouping	38701	Both decimal fractions in units and tenths	Computes the difference	6.7 — 1.8 = ____ (4.9)
	38702	Both decimal fractions in hundredths	Computes the difference	.53 — .08 = ____ (.45)
	38703	Both decimal fractions in thousandths	Computes the difference	.738 — .259 = ____ (.479)
	38704	Both decimal fractions in thousandths, "0" in hundredths place of minuend	Computes the difference	.608 — .438 = ____ (.170 or .17)
390 Uneven, Regrouping	39001	One decimal fraction in units and hundredths, one in tenths	Computes the difference	6.04 — .3 = ____ (5.74)

MULTIPLICATION

393 Even	39301	Both decimal fractions in tenths	Computes product	0.5 × 0.9 = ____ (.45)
	39302	One decimal fraction in units and tenths, one in tenths	Computes product	0.7 × 3.2 = ____ (2.24)
396 Uneven	39601	One decimal fraction in thousandths with "0" in tenths and hundredths places, one in tenths	Computes product	0.008 × 0.5 = ____ (.004)
	39602	One decimal fraction in thousandths with "0" in tenths and hundredths places, one in hundreths with "0" in tenths	Computes product	0.007 × .09 = ____ (.00063)
	39603	Both decimal fractions in units and hundredths	Computes product	51.57 x 76.08 = ____ (3923.4456)
	39604	One decimal fraction in thousandths, one in powers of 10	Computes product	.572 × 1,000 = ____ (572)

DECIMALS

DIVISION

SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
399 Remainder = 0	39901	Both decimal fractions in tenths—no remainder	Computes quotient	.8 ÷ .2 = ____ (4)
	39902	First decimal in tenths, second is whole—no remainder	Computes quotient	64.8 ÷ 2 = ____ (32.4)
	39903	First decimal in hundredths, second in tenths—no remainder	Computes quotient	30.08 ÷ 9.4 = ____ (3.2)
	39904	First decimal in tenths, second in thousandths—no remainder	Computes quotient	21.4 ÷ 2.675 = ____ (8)
	39905	First decimal in thousandths with zero in tenths and hundredths, second decimal in hundredths with zero in tenths—no remainder	Computes quotient	1.008 ÷ 0.09 = ____ (11.2)
402 Remainder > 0	40201	Both in tenths—remainder	Computes quotient	.5 ÷ .3 = ____ (1.6 2/3 or 1.6 or 1.6 . . .)
	40202	First decimal in hundredths, second in tenths—remainder	Computes quotient	9.54 ÷ 2.7 = ____ (3.53 or 3.533 . . .)
	40203	First decimal in tenths, second in hundredths—remainder	Computes quotient	5.5 ÷ .32 = ____ (17.1875)

APPLICATIONS

405 Addition Word Problems	40501	A. A word problem involving the addition of decimals	Identifies an addition procedure for solving the problem	"Mr. Jones bought one book for $9.32 and another for $6.49. How much did he spend?" (add price of the two books)
		B. A word problem involving the addition of decimals	Identifies an addition number sentence for solving the problem	($9.32 + $6.49 = ____)
		C. A word problem involving the addition of decimals	Identifies the answer to the problem	($15.81)

PERCENT

DEFINITION

	SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
420	Terms and Symbols	42001	The symbol "%"	Identifies the symbol as standing for "percent"	% (percent)

CONVERSIONS

423	Decimal to %	42301	A two-place decimal fraction	Identifies an equivalent percent	.26 (26%)
		42302	A three-place decimal fraction	Identifies an equivalent percent	.103 (10.3%)
		42303	A decimal fraction in units and tenths	Identifies an equivalent percent	1.1 (110%)
426	% to Decimal	42601	A (whole) percent $< 10\%$, $> 1\%$	Identifies an equivalent decimal fraction	5% (.05)
		42602	A (whole) percent $< 100\%$, $> 10\%$	Identifies an equivalent decimal fraction	25% (.25)
		42603	A (whole) percent $< 1{,}000\%$, $> 100\%$	Identifies an equivalent decimal fraction	280% (2.8)
		42604	A percent in decimal fraction form	Identifies an equivalent decimal fraction	25.3% (.253)
		42605	A percent in mixed fraction form	Identifies an equivalent decimal fraction	12 1/2% (.125)
429	Fraction to %	42901	A unit fraction with a denominator of 2, 4, 5, or 10	Identifies an equivalent percent	1/4 (25%)
		42902	A nonunit fraction with denominator a factor of 100	Identifies an equivalent percent	3/20 (15%)
		42903	A fraction with denominator a factor of 1,000, 10,000, etc. but not of 100	Identifies an equivalent percent	1/8 (12.5% or 12 1/2%)

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DECIMALS

APPLICATIONS

SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
408 Subtraction Word Problems	40801	A. A word problem involving the subtraction of decimals	Identifies a subtraction procedure for solving the problem	"John lives 1.38 miles from school. One day after school he got a ride part way home. If he rode for .57 of a mile, how much further did he have to walk to get home?" (subtract .57 from 1.38)
		B. A word problem involving the subtraction of decimals	Identifies a subtraction number sentence for solving the problem	(1.38 — .57 = ____)
		C. A word problem involving the subtraction of decimals	Identifies the answer to the problem	(.81)
411 Multiplication Word Problems	41101	A. A word problem involving the multiplication of decimals	Identifies a multiplication procedure for solving the problem	"The sales tax in a certain town is .06 of the price of an item. Sylvia bought a radio marked $8.95. How much tax did she pay? (multiply sales tax by cost of item)
		B. A word problem involving the multiplication of decimals	Identifies a multiplication number sentence for solving the problem	($8.95 × .06 = ____)
		C. A word problem involving the multiplication of decimals	Identifies the answer to the problem	($.54 or 53.7¢)
414 Division Word Problems	41401	A. A word problem involving the division of decimals	Identifies a division procedure for solving the problem	"A baseball player's final batting average is .8 of what it was in June. If his final average is .240, what was it in June?" (divide final average by .8)
		B. A word problem involving the division of decimals	Identifies a division number sentence for solving the problem	(.240 ÷ .8 = ____)
		C. A word problem involving the division of decimals	Identifies the answer to the problem	(.300)

DECIMALS

APPLICATIONS

SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
417 Mixed Operations Word Problems	41701	A. A word problem involving mixed operations (+, —, ×, ÷) of decimals	Identifies an arithmetic procedure for solving the problem	"Mr. Garcia paid $.36 sales tax when he bought a book. If sales tax is .06, how much money did Mr. Garcia spend?" (divide $.36 by .06 and add the sales tax to result)
		B. A word problem involving mixed operations (+, —, ×, ÷) of decimals	Identifies a number sentence for solving the problem	({.36 ÷ .06} + .36 = ____)
		C. A word problem involving mixed operations (+, —, ×, ÷) of decimals	Identifies the answer to the problem	($6.36)

100

101

PERCENT

AREA--TOPICS		SUBTOPICS	PAGE(S)
5110	Percent--Definition	420	51
5120	Percent--Conversions	423-432	51-52
5130	Percent--Calculations	435-441	52-53
5140	Percent--Applications	444	53-54

PERCENT

CONVERSIONS

SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
432 % to Fraction	43201	A percent $< 10\%, > 1\%$	Identifies an equivalent fraction	5% (5/100 or 1/20)
	43202	A percent $< 100\%, > 10\%$	Identifies an equivalent fraction	25% (25/100 or 1/4)
	43203	A percent $< 1{,}000\%, > 100\%$	Identifies an equivalent fraction	280% (280/100 or 14/5 or 2 4/5)
	43204	A percent in decimal fraction form	Identifies an equivalent fraction	1.5% (15/1,000 or 3/200)
	43205	A percent in mixed fraction form	Identifies an equivalent fraction	1/2% (1/200)

CALCULATIONS

435 A% of B = ____	43501	The percent (A) is whole ($> 10\%, < 100\%$) and the other factor (B) is whole	Identifies the answer	25% of 50 = ____ (12.5)
	43502	The percent (A) is whole ($> 1\%, < 10\%$) and the other factor (B) is whole	Identifies the answer	3% of 16 = ____ (.48)
	43503	The percent (A) is whole ($> 100\%, < 1{,}000\%$) and the other factor (B) is whole	Identifies the answer	250% of 26 = ____ (65)
	43504	The percent (A) is a mixed fraction, the factor (B) is a whole number	Identifies the answer	12 1/2% of 60 = ____ (7.5)
	43505	The percent (A) is a mixed decimal fraction, the other factor (B) is whole	Identifies the answer	3.5% of 200 = ____ (7)
438 A% of ____ = C	43801	The percent (A) is whole, the product (C) is whole, and the answer is whole	Identifies the answer	15% of ____ = 30 (200)

PERCENT

CALCULATIONS

SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
438 A% of B = C (continued)	43802	The percent (A) is a mixed decimal fraction, the product (C) is whole, and the answer (B) is whole	Identifies the answer	31.25% of ____ = 25 (80)
441 A% of B = C	44101	The other factor (B) is whole, the product (C) is whole, and the answer (A) is whole (> 100%)	Identifies the answer	____% of 18 = 36 (200)
	44102	The other factor (B) is a decimal fraction, the product (C) is a decimal fraction, answer (A) is whole (< 100%)	Identifies the answer	____% of 61.8 = 12.36 (20)

APPLICATIONS

444 Word Problems	44401	A. A word problem with solution in the form A% of B = ____	Identifies the arithmetic procedure for solving the problem	"45% of the adults in a certain town voted in an election. If there are 4,320 adults in the town, how many people voted in the election?" (multiply 45% by 4,320)
		B. A word problem with solution in the form A% of B = ____	Identifies a number sentence for solving the problem	(.45 × 4,320 = ____)
		C. A word problem with solution in the form A% of B = ____	Identifies the answer to the problem	(1944)
	44402	A. A word problem with solution in the form ____% of B = C	Identifies the arithmetic procedure for solving the problem	"An eighth grade class has 32 students. If 8 of the students were absent on a certain day, what percent of the class was absent?" (divide 8 by 32)
		B. A word problem with solution in the form ____% of B = C	Identifies a number sentence for solving the problem	(____% × 32 = 8 or 8 ÷ 32 × 100 = ____)

PERCENT

APPLICATIONS

SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
444 Word Problems (continued)	44402	C. A word problem with solution	Identifies the answer to the problem	(25%)
	44403	A. A word problem with solution in the form A% of ____ = C	Identifies the arithmetic procedure for solving the problem	"On José's 13th birthday, his father told him that his allowance would be increased to $6.00 a month. This was 150% of the amount he had received before. How much allowance did he receive per month before his 13th birthday?" (divide $6.00 by 150%)
		B. A word problem with solution in the form A% of ____ = C	Identifies a number sentence for solving the problem	(150% of ____ = 6 or 6 ÷ 1.5 = ____)
		C. A word problem with solution in the form A% of ____ = C	Identifies the answer to the problem	($4.00)

110

199

MEASUREMENT

AREA -- TOPICS		SUBTOPICS	PAGE(S)
6110	Measurement--Linear	447-474	57-59
6120	Measurement--Area	477-510	59-62
6130	Measurement--Volume	513	62
6140	Measurement--Time	516-522	62-63
6150	Measurement--Temperature	525-528	63-64
6160	Measurement--Weight (Mass)	531	64
6170	Measurement--Capacity	534	64
6180	Measurement--Money	537-555	65-66

MEASUREMENT

LINEAR

SUBTOPICS		GIVEN		THE STUDENT	EXAMPLE
447	Error of Measurement	44701	A linear measurement in English or metric units	Finds the greatest possible error	140 meters (10 meters)
		44702	A measure and the greatest possible error of the measure and the accompanying linear measurement	Computes the relative error and expresses it as a fraction, a decimal, and a percent	16 feet; 1 foot (1/16, .0625, 6.25%)
450	Conversions, English Units	45001	A. An English unit of linear measurement and a subunit of the unit	Identifies the number of subunits making up the unit	1 foot ____ inches (12)
			B. An English subunit of linear measurement	Identifies the unit of English linear measurement corresponding to the subunits	Inches (feet)
453	Measurement, English Units	45301	A. An English subunit of linear measurement	Measures the length of an object or line segment using the units	(Depends on objects measured)
			B. Several English units of linear measurement and appropriate objects or line segments	Identifies an object or line segment whose length corresponds to a given number of units	(Depends on units given and objects measured)
456	Conversions, Metric Units	45601	A metric unit of linear measurement (km or m) and a subunit of the unit (m, cm, mm)	Identifies the number of subunits making up the unit	1 meter ___ centimeters (100)
459	Measurement, Metric Units	45901	A. A line segment	Measures with a ruler and expresses length to the nearest millimeter	(Depends on line segment to be measured)
			B. Several metric units of linear measurement	Identifies an object or line segment whose length corresponds to a given number of units	(Depends on units given and objects measured)
		45902	A length expressed in metric units and subunits.	Expresses the measure in one of the units or subunits using decimal notation	5 meters, 23 centimeters, 5 millimeters, (5.235 m or 523.5 cm or 5235 mm)

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MEASUREMENT

LINEAR

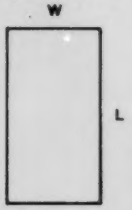
SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
462 Measuring Perimeter	46201	An English unit of linear measurement and a simple geometric shape	Identifies the length of the perimeter of the shape to the nearest unit	Inches (Answer depends on shape chosen)
	46202	A unit of metric linear measurement and a simple geometric shape	Identifies the length of the perimeter of the shape to the nearest unit	Millimeters (Answer depends on shape chosen)
465 Scaling, Maps, and Drawings	46501	A scaled map	Identifies linear distances on a scaled map	(Depends on map used)
	46502	A scaled drawing	Measures lengths on the scaled drawing and converts them to actual lengths	(Depends on drawing used)
	46503	A scale drawing of a figure	Identifies a missing measurement using a ruler and the scale of the drawing	(Depends on drawing used)
	46504	The dimensions of an object or simple geometric shape to be drawn	Identifies an appropriate scale for making a drawing of the object or shape	(Depends on object or shape used)
468 Computing Perimeter	46801	A simple geometric shape	Identifies a formula for computing the perimeter of the shape	Rectangle (2L + 2W) or [2 (L + W)]
	46802	A simple geometric shape	Compute the perimeter of the shape using a formula ($\pi = 3.14$)	Circle R = 10″ (P = 62.8″)
471 Word Problems (English Units and Subunits)	47101 A.	A word problem involving linear measurements in units and subunits	Identifies conversions of English units and subunits make addition or subtraction operations possible	"Sally's pet snake has grown 9 inches since last summer. It is now 3 feet long. How long was it last summer?" (3 ft. = 2 ft. 12 in.)
	B.	A word problem involving linear measurements in units and subunits	Computes sums or differences to solve word problem	(2 ft. 12 in — 9 in. = 2 ft. 3 in.)

MEASUREMENT

LINEAR

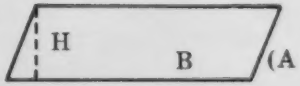
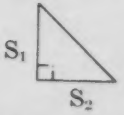
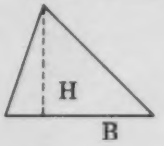
	SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
474	Word Problems (Metric Units and Subunits)	47401	A. A word problem involving linear measurements in metric units and subunits	Identifies conversions of metric units and subunits to make addition or subtraction operations possible	"Manuel runs on the school's track team. During practice one day he first ran 3 km, then later he ran 400 m. How many meters did he run altogether?" (3 km = 3,000 m)
			B. A word problem involving linear measurements in metric units and subunits	Computes sums or differences to solve word problem	(3,000 m + 400 m = 3,400 m)
		47402	A problem using applications of area, perimeter, or volume and the following types of measurement in the metric system: linear, square, and cubic	Selects the most appropriate unit that could be used in solving the problem	What unit of measure would you use to measure how big in volume this room is? (cubic meters)

AREA

477	Measuring Area by Tiling Grids, etc.	47701	A. An arbitrary unit of area measurement	Identifies the number of arbitrary area units in a given region	Square inch (depends on region chosen)
			B. A given number of units of an arbitrary unit of area measurement	Identifies an object whose area corresponds to the given number of units	6 cm^2—several regions, one of which has area of 6 cm^2
		47702	A simple geometric figure and an arbitrary unit of area	Identifies area of the figure using a grid	3" x 4" rectangle, a grid of 1/4" squares (192 units)
480	Computing Area of Rectangle	48001	A rectangle	Identifies a formula for computing the area of the rectangle	 (A = L × W)

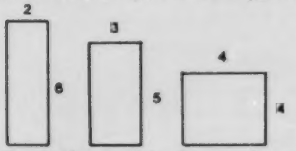
MEASUREMENT

AREA

SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
480 Computing Area of Rectangle (continued)	48002	The dimensions of a rectangle	Computes the area	L = 8 m; W = 4 m (A = 32 m²)
	48003	The area and one dimension of a rectangle	Computes the missing dimension of the rectangle	A = 168 m²; L = 14 m (W = 12 m)
483 Computing Area of Parallelogram	48301	A parallelogram	Identifies a formula for computing the area of the parallelogram	 (A = B × H)
	48302	The dimensions of a parallelogram	Computes the area of the parallelogram	B = 26 cm; H = 10 cm (A = 260 cm²)
	48303	The area and one dimension of a parallelogram	Computes the missing dimension of the parallelogram	A = 350 in²; B = 14 in (H = 25)
486 Computing Area of Right Angle	48601	A right triangle	Identifies a formula for computing the area of the right triangle	 (A = 1/2 S₁ × S₂)
	48602	The dimensions of a right triangle	Computes the area of the triangle	S₁ = 3 m; S₂ = 7 m (A = 10 1/2 m²)
	48603	The area and one dimension of a right triangle	Computes the missing dimensions of a right triangle	A = 85 cm²; S₁ = 170 m (S₂ = 10 cm)
489 Computing Area of Non-Right Triangle	48901	A (non-right) triangle	Identifies a formula for computing the area of the triangle	 (A = 1/2 B × H)
	48902	The dimensions of a (non-right) triangle	Computes the area of the triangle	B = 10 in; H = 2.5 in (12.5 in²)

MEASUREMENT

AREA

	SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
489	Computing Area of Non-Right Triangle (continued)	48903	The area and one dimension of a (non-right) triangle	Computes the missing dimension of the triangle	A = 1120 ft²; B = 56 ft (H = 40 ft)
492	Computing Area of Circle	49201	A circle	Identifies a formula for computing the area of the circle	($A = \pi r^2$)
		49202	The radius or diameter of a circle	Computes the area of the circle ($\pi = 3.14$)	r = 5 cm (A = 78.5 cm²)
		49203	The area of a circle	Computes the radius or diameter of the circle ($\pi = 3.14$)	A = 314 m²; D = ? (20 m)
495	Relations between Perimeter and Area	49501	Relations between simple geometric figures with different area and dimensions but a constant perimeter	Identifies differences in area of the figures	 (last figure has largest area)
498	Converting between English Measures of Area	49801	Area expressed in an English unit (sq. ft., sq. yd., sq. in.)	Identifies an equivalent area expressed in an English subunit	4 yd² (36 ft²)
501	Converting between Metric Measures of Area	50101	Area expressed in a metric unit (sq. meter, sq. cm)	Identifies an equivalent area expressed in a metric subunit	15 cm² (1,500 mm²)
504	Computing Surface Area of a Rectangular Solid	50401	A rectangular solid	Identifies a process for computing the surface of the rectangular solid	(Calculate area of each face—add them together)
		50402	The dimensions of a rectangular solid	Computes the surface area of a rectangular solid	L = 5 m, H = 3 m, W = 4 m (94 cm²)
507	Acre Measure	50701	The English land area unit, acre	Identifies the fact that the area unit, acre, is independent of shape (i.e., not based on a standard unit of length)	Acre (not based on a standard unit of length)

MEASUREMENT

AREA

SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
510 Word Problem (Computing Area)	51001	A word problem involving the surface area of a simple geometric figure	Identifies a formula for solving the word problem	"What is the surface area of a shoe box that has a length of 28 cm, a width of 15 cm, and a height of 12 cm?" (2LW + 2WH + 2LH)
	51002	A word problem involving the surface area of a simple geometric figure	Computes the area of the shoe box	(1,872 cm^2)

VOLUME

513 Measurement of Volume	51301	An arbitrary unit of volume	Identifies the number of units in a given object	Cube 1/2" on a side—How many of these units in a given (small) box?
	51302	A given number of units of an arbitrary unit of volume	Identifies an object whose volume corresponds to the given number of units	8 units (names object such as cube with sides of 2 units)
	51303	A rectangular solid	Identifies the volume of the quantity using the metric system of measurement	Block of wood (measures dimensions and multiplies to find volume)
	51304	An irregularly shaped solid object	Identifies the volume of the quantity using the metric system of measurement	Rock (uses water displacement to measure the volume)

TIME

516 Names of Days and Months	51601	The name of a day of the week	Names the following and preceding days of the week	Monday (Tuesday, Sunday)
	51602	The name of a month of the year	Names the following and preceding months	July (August, June)

MEASUREMENT

TIME

SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
519 Units and Subunits of Clock Time	51901	A. A unit of time	Identifies an equivalent number of subunits of the given unit	Day (24 hours)
		B. A number of subunits of time equal to a unit of time	Identifies an equivalent unit of time	60 minutes (1 hour)
522 Telling Time	52201	A. A display of clock hands showing an exact hourly time	Identifies the time represented on the clock	3 o'clock displayed on a clock (3:00)
		B. An exact hour of the day (seven o'clock, etc.)	Identifies the corresponding clock representation	7 o'clock (Move hands of clock to show 7:00)
	52202	A. A display of clock hands showing a time in minutes (2:47, etc.)	Identifies the time represented on the clock	2:47 displayed on a clock (2:47)
		B. A time of day in minutes (9:36, etc.)	Identifies the corresponding clock representation	9:36 (moves hands of clock to show 9:36)
	52203	A given hour of the day	Names the hour that is one hour later and one hour earlier	Five o'clock (six o'clock, four o'clock)

TEMPERATURE

525 Reading a Temperature Fahrenheit Gauge (F°)	52501	A. A temperature gauge graduated in degrees Fahrenheit	Names the scale as Fahrenheit and names temperature to the nearest degree	Temperature gauge showing 52°F (Fahrenheit, 52°)
		B. A given temperature (F)	Identifies a temperature gauge representing the given temperature	104°F (draws mark to show 104°F on picture of temperature gauge)
528 Reading a Temperature Celsius Gauge (C°)	52801	A. A temperature gauge graduated in degrees Celsius	Names the scale as Celsius and names temperature to the nearest degree	Temperature gauge showing 12°C (Celsius, 12°C)
		B. A given temperature (C)	Identifies a temperature gauge representing the given temperature	82°C (draws mark to show 82°C on picture of temperature gauge)

MEASUREMENT

TEMPERATURE

SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
528 Reading A Temperature Gauge (C°) (continued)	52802	A. (F or C) temperature gauge with a temperature below, at, or above the freezing point of water	Identifies the temperature as "at," "below," or "above" the freezing point of water	Temperature gauge showing —5°C ("below freezing")
		B. (F or C) temperature gauge with a temperature below, at, or above the boiling point of water	Identifies the temperature as "at," "below," or "above" the boiling point of water	Temperature gauge showing 100°C ("at boiling")

WEIGHT (MASS)

531 Measuring Weight	53101	Pan balance, arbitrary units of weight, and an object to be weighed	Identifies the weight (mass) of the object in the arbitrary unit of weight	How many ounces does a chalkboard eraser weigh?
	53102	A spring scale and an object to be weighed	Identifies the weight (mass) in pounds	A person (finds weight in lbs.)
	53103	A pan balance, metric weights, and an object to be weighed	Identifies the mass (weight) in kilograms and/or grams	Book (finds weight in kg & g)
	53104	A standard metric unit of mass (weight)	Converts the measure to an indicated equivalent measure in the metric system	1 kilogram = ____g (1,000)

CAPACITY

534 Measuring Capacity	53401	The unit of measure "pint"	Identifies the number of cups in a pint	1 pint (2 cups)
	53402	The unit of measurement "liter"	Identifies the number of milliliters in a liter	1 liter (1000 ml)
	53403	A given amount of liquid and a graduated cylinder marked in metric units	Identifies the volume of the liquid in liters or milliliters using the graduated cylinder	50 ml of water (50)

MEASUREMENT

MONEY

SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
537 Names of U.S. Coins and Their Values	53701	A. Any one of 5 different U.S. coins	Names the coin	Dime (Dime or 10¢ piece)
		B. The name of any U.S. coin from a collection of coins of different value	Identifies the coin corresponding to the word name	"Quarter" (points to quarter)
	53702	A. Any U.S. coin	Identifies the value of the coin in cents	"Half dollar" (50¢)
		B. A value in cents (1¢, 5¢, 10¢, 25¢, 50¢)	Identifies the corresponding coin	5¢ (Nickel)
540 Value of U.S. Bills	54001	A. A U.S. bill ($1, $5, $10. $20)	Identifies the value of the bill in dollars	$5 bill (five dollars)
		B. A value in dollars corresponding to a U.S. bill (one, five, ten or twenty dollars)	Identifies the bill corresponding to the given value	Twenty dollars ($20 bill)
543 Ordering U.S. Coins	54301	Five different U.S. coins	Identifies the value of the coins in ascending or descending order	5 U.S. coins (places coins in descending order of value)
	54302	Several collections of money, each of whose value is $\leq$ $5	Identifies the collection having the greatest and least value	2 - $1 bills, 6 quarters, 1 dime, 4 pennies; 3 - $1 bills, 1 quarter, 6 nickels, 1 penny (1st collection greatest value, 2nd least)
546 Converting Between Equivalent Money Values	54601	A collection of money whose value is $\leq$ $5	Identifies an equivalent but different collection	A $1 bill, 2 quarters, 1 dime (3 - 50¢ pieces, 2 nickels)
	54602	Any U.S. coin $>$ 1¢	Identifies an equivalent combination of other coins	Quarter (2 dimes, 1 nickel)
	54603	A combination of U.S. coins equal to 5¢, 10¢, 25¢ or 50¢	Identifies an equivalent coin	1 dime, 1 nickel, 10 pennies (quarter)

MEASUREMENT

MONEY

	SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
549	Value of Collections of U.S. Money	54901	A. A collection of coins and U.S. bills totaling $\leq$ \$5	Identifies the value of the collection expressed as dollars and cents (\$__.__)	3 - \$1 bills, 1 - 50¢ piece, 1 quarter, 2 dimes, 3 pennies (\$3.98)
			B. A value of money expressed as dollars and cents (\$__.__) $\leq$ \$5	Identifies a collection of coins and U.S. bills equal to the given value	\$1.45 (one \$1 bill, 1 quarter, 2 dimes)
552	Addition Problems Involving Money	55201	A. An addition problem involving money using the word names of the coins and bills	Identifies the necessary conversions to make the addition possible	2 quarters + 4 nickels (2 quarters = 10 nickels)
			B. An addition problem involving money using the word names of the coins and bills	Computes sum	10 nickels + 4 nickels (14 nickels)
555	Subtraction Problems Involving Money	55501	A. A subtraction problem involving money using word names of the coins and bills	Identifies the necessary conversions to make the subtraction possible	5 dollars — 1 quarter (5 dollars = 4 dollars, 4 quarters)
			B. A subtraction problem involving money using word names of the coins and bills	Computes the difference	(4 dollars, 4 quarters — 1 quarter = 4 dollars, 3 quarters)

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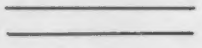
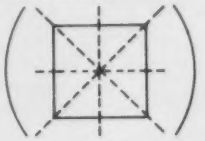
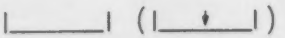
GEOMETRY

AREA--TOPIC	SUBTOPICS	PAGE(S)
7110 Geometry--Basic	558-600	69-72

GEOMETRY

BASIC

	SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
558	Types of Quadrilaterals	55801	A. A property distinguishing a quadrilateral from other quadrilaterals	Identifies the type of quadrilateral having the distinguishing property	Opposite sides are parallel ("parallelogram")
			B. A quadrilateral (rectangle, square, rhombus, parallelogram, trapezoid, isosceles trapezoid)	Names the quadrilateral	Picture of rhombus ("rhombus")
			C. The name of a particular quadrilateral from the collection above	Identifies the quadrilateral corresponding to a particular type	"Trapezoid" (points to trapezoid)
561	Parallel, Perpendicular, Intersecting Lines	56101	A. Parallel, perpendicular, or intersecting line segments	Names the lines or line segments as "parallel," "perpendicular," or "intersecting"	 ("parallel")
			B. The name "parallel," "perpendicular," or "intersecting" and a collection of lines, or line segments	Identifies line segments which are parallel, perpendicular, or intersecting	"Intersecting" (points to intersecting segments)
564	Exterior/Interior Regions of Closed Curves	56401	A simple closed curve	Identifies the exterior and interior regions of the curve	(points to interior and exterior regions)
567	Symmetry of Objects or Figures	56701	A collection of objects or figures some of which are symmetrical	Identifies those objects or figures which possess symmetry	Circle, non-isosceles trapezoid (points to circle)
		56702	A collection of different objects or figures possessing symmetry	Identifies the lines of symmetry in objects or figures	Square 
570	Midpoint of a Line	57001	A line segment	Identifies the midpoint of the given line segment	

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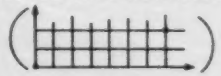
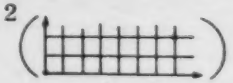
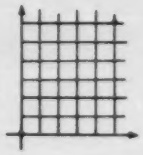
GEOMETRY

BASIC

SUBTOPICS			GIVEN	THE STUDENT	EXAMPLE
573	Points Lying in a Common Plane	57301	A collection of objects or sets of points	Identifies those objects or points which lie in a common plane	Specify a collection of points (points to any three)
576	Intersection of Planes	57601	A display of several intersecting planes	Identifies the intersection of given planes	Pages of book at different angles (Intersection is binding of book)
579	Intersection of Lines and Planes	57901	A display of planes and lines	Identifies the intersection of the lines with the planes	Wires piercing sheets of paper (points to intersection of line and plane)
582	Parallel and Non-Parallel Planes	58201	Parallel and non-parallel planes	Identifies planes which are parallel or non-parallel	Blackboards on opposite walls of a room (parallel)
585	Coordinates and Points	58501	A. A coordinate grid and a point	Identifies the coordinates of the point in the same plane	(Coordinates are 3 and 2)
			B. A coordinate grid and a pair of coordinates	Identifies a point for given coordinates by placing it on a grid	Coordinates of 3 and 2 
		58502	A. Coordinates expressed as an ordered pair	Identifies a point for the coordinates expressed as an ordered pair by placing it on a grid	7, 2 
			B. A coordinate grid and a point	Identifies an ordered pair representing the coordinate of the point	 (5, 6)

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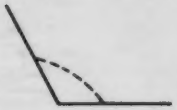
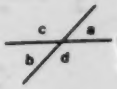
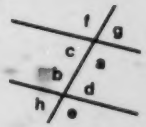
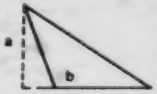
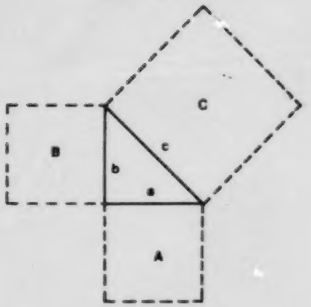
GEOMETRY

BASIC

SUBTOPICS		GIVEN		THE STUDENT	EXAMPLE
585	Coordinates and Points (continued)	58503	A map with coordinates	Identifies areas, points, or places defined by the map coordinates	(Answer depends on map used)
588	Obtuse, Acute, and 90° Angles	58801	A. An angle	Names the angle as "obtuse," "acute," or "right" (90°) angle	 ("obtuse angle")
			B. The name "acute," "obtuse," or "right" (90°) angle	Identifies an obtuse, an acute, or right angle from a collection	"Right angle" (points to right angle)
		58802	An angle	Measures with a protractor and identifies the size of the angle within 2° of the correct measure	65° angle (measures angle as 63°, 64°, 66° or 67°)
591	Congruency of Angles formed by Intersecting Lines	59101	Two intersecting line segments	Identifies congruency of angles formed by the two intersecting line segments	 (a and b are congruent; c and d are congruent)
		59102	A line intersecting two parallel lines	Identifies congruency of angles	 (f, a, b, e are congruent; g, c, d, h are congruent)
594	Diameter, Radius, and Chord of a Circle	59401	A circle with center "C"	Identifies the diameter, radius, and a chord of the circle	(AB & AD are chords; AC is a radius; AD is a diameter)
597	Altitude and Base of a Triangle	59701	A triangle	Identifies an altitude and a base of the triangle	 (a = altitude; b = base)

GEOMETRY

BASIC

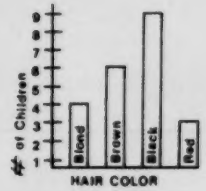
SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
600 Pythagorean Relationship	60001	A geometric display of the Pythagorean relationship	Identifies the Pythagorean relationship	 (The area of C equals the area of A plus the area of B or $a^2 + b^2 = c^2$)
	60002	A geometric display of the Pythagorean relationship	Identifies a formula describing the Pythagorean relationship	(A + B = C or $a^2 + b^2 = c^2$)

PROBABILITY AND STATISTICS

AREA--TOPIC	SUBTOPICS	PAGE(S)
8110 Probability and Statistics--Basic Graphs	603-612	75-76

PROBABILITY AND STATISTICS

BASIC GRAPHS

SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
603 Tallying	60301	A. A collection of marks tallied by 2s, 3s, 4s, or 5s	Identifies the process as "tallying" and identifies the sum	𝍸 𝍸 𝍸 || ("tallying," 14)
		B. A whole number	Identifies a collection of tally marks (by 2s, 3s, 4s, 5s) representing the number	26(| 𝍸 𝍸 𝍸 𝍸 𝍸)
606 Bar Graphs	60601	A. A bar graph representing a set of data	Identifies the data display as a "bar graph" and interprets a given bar (See answers below right)	
		B. A set of data	Identifies a bar graph representing the set of data (See answers above right)	4 children have blond hair 6 children have brown hair 9 children have black hair 3 children have red hair (identifies above bar graph)
609 Data Tables	60901	A set of data in tabular form	Identifies the data display as a "table" and correctly interprets a cell in the table	Population of Hifa, California Year / Population 1925 1,530 1935 1,290 1945 3,000 1955 4,728 1965 4,550 1975 5,220 ("Table;" population of Hifa in 1945 was 3,000)

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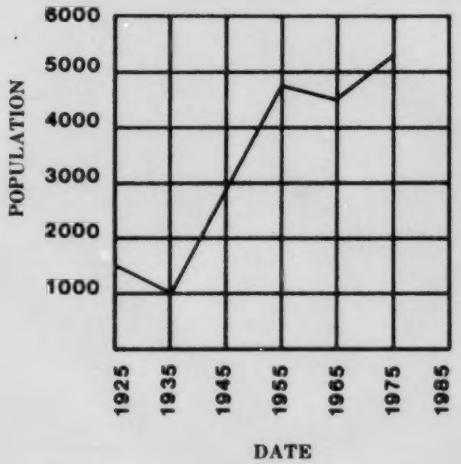
PROBABILITY AND STATISTICS

BASIC GRAPHS

SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
612 Line Graphs	61201	A line graph	Identifies the display as a "line graph" and correctly interprets a point on the graph	Population of Hifa, California ("Line graph": correctly interprets point A. Point A shows the population of Hifa in 1945 was 3,000.)



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SETS

AREA--TOPICS	SUBTOPICS	PAGE(S)
9110 Sets--Single Sets	615-627	78
9120 Sets--Subsets	630-639	79
9130 Sets--Set Relations	642-660	80-81
9140 Sets--Set Operations	663-681	81-82
9150 Sets--Venn Diagrams	684-693	82-84

SETS

SINGLE SETS

	SUBTOPICS			GIVEN	THE STUDENT	EXAMPLE
615	Concept of a Set	61501		A collection of similar objects	Identifies the collection as a set	Group of blue poker chips ("This is a set.")
618	Elements	61801	A.	The words "element of"	Identifies the symbol standing for "element of" (e)	"Element of" (e)
			B.	The symbol denoting "element of" (e)	Identifies a correct use of the symbol denoting "element of"	e (José e the class--José is a member of the class)
			C.	A collection of similar and unlike objects	Identifies those objects belonging to a set using the symbol for "element of"	A collection of numbers--2, 3, 5, 6, 12, 17, 76 (2 e even numbers)
621	Set Notation for Single Sets	62101	A.	A collection of objects	Identifies a set notation description of the collection	The pupils sitting at Table 1 ({John, Mary, Julio, Juanita, Reggi})
			B.	Set notation describing a (small) set	Identifies those elements belonging to the set	{1, 6, 23, 0, 14} (The numerals 1, 6, 23, 0, 14)
624	Set Cardinality	62401	A.	A finite set of objects	Identifies the cardinality of the set	The set of girls in your class (14)
			B.	A cardinal number	Identifies a set having the given cardinal value	6 ({0, 1, 2, 3, 4, 5}) or (any other set having six numbers)
		62402		An infinite collection of entities	Identifies set notation appropriate to the given collection	Set of whole numbers ({1, 2, 3, 4,...})
627	Empty Set	62701	A.	An empty set	Identifies a correct symbol for the empty set	The number of elephants in this class ({ } or ∅)
			B.	Symbol for an empty (null) set	Identifies a set (empty) corresponding to the symbol for an empty set	∅ or { } (The number of fifth graders in this school who are grandmothers)

SETS

SUBSETS

SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
630 Concept of a Subset	63001	A. A set with a specified subset	Names the specified subset as a "subset"	The set of numbers 1 - 10 and the numbers 2 and 3 (2 and 3 are a subset of the numbers 1 - 10)
		B. The name "subset"	Identifies a subset of a given set	"Name a subset of the set of whole numbers" (even numbers)
	63002	A. A set with a specified subset	Identifies the elements contained in the subset	Set of fractions between 0 and 1, subset—fractions with denominator of 4 (1/4, 2/4, 3/4)
		B. The elements contained in a subset	Identifies a set containing the listed elements as a subset	Jack, Maria (subset of the set of people in class who have brown eyes)
633 Subset Notation	63301	Several subsets of the set of whole numbers	Identifies the subsets	Even numbers ({3, 4, 6, . . .}) numbers between 5 and 10 ({6, 7, 8, 9})
636 Generating Subsets	63601	Given a set with a small cardinal value ($N < 4$)	Identifies all possible subsets	{1, 2, 3} (∅, {1}, {2}, {3}, {1, 2}, {1, 3}, {2, 3}, {1, 2, 3})
	63602	A set with small cardinal value ($N < 4$)	Identifies the number of all possible subsets contained in the subset	{1, 2, 3, 4} (16 subsets)
	63603	Notation for the null (empty) set ({ }, ∅)	Identifies ∅ as a subset of all sets	∅ ("This is a subset of all sets")
639 Multiple Subsets	63901	A number of finite subsets > 2 in set notation (disjoint sets)	Identifies the elements contained in the union using set notation	{1, 2, 3} {4, 5, 7} {8, 9, 12, 13} ({1, 2, 3, 4, 5, 7, 8, 9, 12, 13})
	63902	A number of finite subsets > 2 in set notation (no disjoint sets)	Identifies the elements contained in the intersection of all the sets using set notation	{1, 2, 3} {2, 3, 5} {2, 5, 8} ({2})

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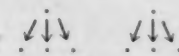
SETS

SET RELATIONS

SUBTOPICS		GIVEN		THE STUDENT	EXAMPLE
642 One-to-One	64201	A.	The relation name "one-to-one"	Identifies sets having a one-to-one relation	"One-to-one" (5 flowers and 5 girls, one to each)
		B.	Sets having a one-to-one relation	Names the set relation as "one-to-one"	8 dogs, 8 boys, one dog to each boy ("one-to-one")
645 Many-One	64501	A.	The relation name "N-to-one" or "many-one"	Identifies sets having an N-to-one (or many-one) relation	"Many-one" ($25, 5 people—$5 to each person)
		B.	Sets having an N-to-one (or many-one) relation	Names the set relation as "N-to-one" (or "many-one")	51 pieces of candy, 17 people—3 pieces of candy for each person (many-one)
648 One-Many	64801	A.	The relation name "one-many"	Identifies sets having a one-many relation	"One-many" (5 people, 25 books—one person to five books)
		B.	Sets having a one-many relation	Names the set relation as "one-many"	17 people, 51 pieces of candy—one person to 3 pieces of candy (one-many)
651 Many-Many	65101	A.	The relation name "many-many"	Identifies sets having a many-many relation	"Many-many" (5 people 5 stores—each person to five stores)
		B.	Sets having a many-many relation	Names the set relation as "many-many"	35 children 5 classes—each person to 5 classes (many-many)
654 Mapping	65401	A.	Mappings of pair of sets	Names the (mapped) relations as "one-many" and "many-one"	 (one-many)
		B.	The names of pairs of sets	Identifies mappings corresponding	One-one
657 Identity	65701		Pairs of sets which are identical and pairs which are non-identical	Identifies and names pairs of sets which are identical	{1, 2, 3} {4, 5, 6} {1, 2, 3} {7, 8, 9} ({1, 2, 3} and {1, 2, 3} are identical)

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SETS

SET RELATIONS

SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
660 Equivalence	66001	Pairs of sets which are equivalent and pairs which are non-equivalent	Identifies and names pairs of sets which are equivalent	{1, 2, 3} {5, 6, 7} {12, 14, 6, 0} ({1, 2, 3} and {5, 6, 7} are equivalent)

SET OPERATIONS

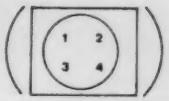
663 Terms and Symbols	66301	A. The word "union"	Identifies the corresponding symbol "U"	Union (U)
		B. The symbol "U"	Names the symbol as standing for "Union"	U (Union)
	66302	A. The word "intersection"	Identifies the corresponding symbol "Ω" for intersection	Intersect (Ω)
		B. The symbol "Ω"	Names the symbol as standing for "intersection"	Ω (Intersection)
	66303			
		A. The name "complement of the set, A"	Identifies the corresponding symbol "A' " or "~A"	Complement of A (A' or ~A)
		B. The symbol "A' " or "~A"	Identifies meaning for A' or ~A	A' or ~ A (Complement of A)
666 Union	66601	Two finite disjoint sets (in set notation)	Identifies the elements contained in the union (using set notation)	{3, 4, 5, 9}U{7, 10, 11} = ({3, 4, 5, 8, 9, 10, 11})
	66602	Two finite (non-disjoint) sets (in set notation)	Identifies the elments contained in the union (using set notation)	{a, b, c}U{b, a, d} = ({a, b, c, d})
669 Intersection	66901	Two finite disjoint sets (in set notation)	Identifies the intersection as the empty set	{1, 3, 7}Ω{6, 5, 8} = (ø)
	66902	Two finite (non-disjoint) sets (in set notation)	Identifies the elements contained in the intersection (using set notation)	{1/2, 1/4, 3/8}Ω{1/2, 1/4, 5/6} ({1/2, 1/4})

SETS

SET OPERATIONS

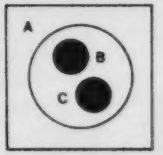
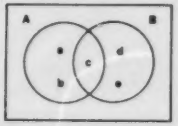
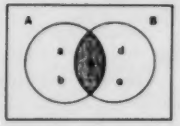
SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
672 Complement	67201	A universal set and a set, A, contained in the universal set (in set notation)	Identifies the elements contained in the complement of set A (using set notation)	U = (2, 4, 6, 8, 10, 12) A = {8, 10, 12} A' = ____ ({2, 4, 6})
675 Commutative Property	67501	$A \cap B = B \cap A$	Identifies the relation as commutative	$A \cap B = B \cap A$ (Commutative Property)
	67502	$A \cup B = B \cup A$	Identifies the relation as commutative	$A \cup B = B \cup A$ (Commutative Property)
678 Associative Property	67801	$(A \cap B) \cap C = A \cap (B \cap C)$	Identifies the relation as associative	$(A \cap B) \cap C = A \cap (B \cap C)$ (Associative Property)
	67802	$(A \cup B) \cup C = A \cup (B \cup C)$	Identifies the relation as associative	$(A \cup B) \cup C = A \cup (B \cup C)$ (Associative Property)
681 Distributive Property	68101	$A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$	Identifies the relation as distributive	$A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$ (Distributive Property)
	68102	$A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$	Identifies the relation as distributive	$A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$ (Distributive Property)

VENN DIAGRAMS

684 Concept and Terms	68401	A. A Venn diagram of a single set	Names the display a "Venn diagram"	(Venn diagram)
		B. The name "Venn diagram"	Identifies sets which are displayed as Venn diagrams from a collection of different set descriptions	Venn diagram 

SETS

VENN DIAGRAMS

SUBTOPICS			GIVEN	THE STUDENT	EXAMPLE
684	Concept and Terms (continued)	68402	A Venn diagram consisting or a single set with subsets	Names the Venn diagram as a Venn diagram of subsets	 (subsets)
687	Union	68701	A. A Venn diagram of the union of two sets with $A \cup B \neq \emptyset$	Identifies the elements contained in the union	 (a, b, c, d, e are in the union)
			B. A Venn diagram of the union of two sets with $A \cup B \neq \emptyset$	Names the union as "union"	(Union)
			C. A Venn diagram of the union of two sets with $A \cup B \neq \emptyset$	Identifies the elements contained in the union using set notation	({a, b, c, d, e})
690	Intersection	69001	A. A Venn diagram of the intersection of two sets with $A \cap B \neq \emptyset$	Identifies the elements contained in the intersection	 (c is in the intersection)
			B. A Venn diagram of two sets with $A \cap B \neq \emptyset$	Names the intersection as "intersection"	(Intersection)
			C. A Venn diagram of two sets with $A \cap B \neq \emptyset$	Identifies the elements contained in the intersection using set notation	({c})

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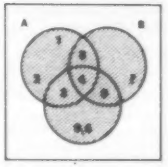
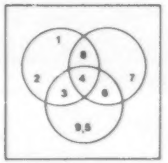
SETS

VENN DIAGRAMS

SUBTOPICS		GIVEN	THE STUDENT	EXAMPLE
693 Multiple Sets	69301	A. A number of subsets > 2 displayed as Venn diagrams (no disjoint sets)	Identifies the elements contained in the union	 (1, 2, 3, 4, 5, 6, 7, 8, 9)
		B. A number of subsets > 2 displayed as Venn diagrams (no disjoint sets)	Identifies the elements contained in the union using set notation	({1, 2, 3, 4, 5, 6, 7, 8, 9})
	69302	A. A number of subsets > 2 displayed as Venn diagrams (no disjoint sets)	Identifies the elements contained in the intersection	 (4)
		B. A number of subsets > 2 displayed as Venn diagrams (no disjoint sets)	Identifies the elements contained in the intersection using set notation	({4})

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